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## THE COMMISSION ON THE BLIND.

M. Post. 11/10/86

The Royal Commission on the Blind, the Deaf and Dumb, &c., have just finished a tour of visits to some of the principal institutions of the North of England and Scotland. The Commissioners who took part in the tour were Lord Egerton of Tatton (chairman), Mr. W. Woodall, M.P., Rev. W. B. Sleight, Rev. C. M. Owen, Dr. J. R. Armitage, Mr. E. C. Johnson, Mr. B. St. John Ackers, Mr. W. A. Arrol, and Mr. Charles E. D. Black (secretary). The institutions visited were the following:—The Blind Institution, Petersgate, Stockport; Henshaw's Blind Asylum and Workshops, Manchester; the Manchester Deaf and Dumb Schools, Old Trafford; and Association for the Adult Deaf and Dumb, Manchester; the Liverpool Deaf and Dumb School, the workshops and day-school in connection with the Home Teaching Society for the Outdoor Blind, Cornwallis-street, School for the Indigent Blind, Hardman-street, and the Catholic Blind Asylum, Liverpool; the Bolton Workshops for the Blind; the Preston Industrial Institute for the Blind; the Royal Albert Asylum for Idiots and Imbeciles of Northern Counties, Lancaster; the Carlisle Workshops for the Blind of Cumberland and Westmoreland; the Sunderland and Durham County Institute for the Blind, and the School Board blind class there; the Northern Counties Institution for the Deaf and Dumb, and the Royal Victoria Asylum for the Industrious Blind, Newcastle-on-Tyne, and the Workshops for the Blind at the same town; the Edinburgh Royal Blind Asylum and School, the deaf and dumb children taught at Donaldson's Hospital, and the Deaf and Dumb Institution in Henderson-row; the Institution for the Blind and the Deaf and Dumb Class at Dundee; the Aberdeen Blind Asylum and Workshops, the Institution for the Deaf and Dumb, Belmont-street, and a middle-class school kept by Miss Falconer, a blind lady, in the same town; the class for the deaf and dumb held in connection with the School Board, Greenock; the Larbert Asylum for Imbeciles and the Glasgow School Board Class and Blind and Deaf and Dumb Institutions. Besides inspecting the above the commissioners had numerous interviews with ladies and gentlemen interested in the cause of the classes included in the terms of reference to the Commission, with superintendents of outdoor missions, and with deputations of blind working men. The Commissioners have accumulated through personal observation a mass of valuable information which they propose to supplement during the ensuing months by the oral testimony of the principal witnesses of the institutions referred to. The whole tour has occupied 16 days.

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per. Wm Harris Esqre.
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At Committee Meeting
held. 16.5.90.

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# THE BLIND

## SCHOOL BOARD FOR LONDON, 1876

*REPRINT OF THE*

# REPORT OF CONFERENCE

ON THE

# INSTRUCTION OF BLIND CHILDREN

*&c.*

HELD JULY 21st, 1876

Printed by
SPOTTISWOODE & CO., NEW-STREET SQUARE, LONDON
1886

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SPOTTISWOODE AND CO., NEW-STREET SQUARE
LONDON

[*To be considered at the School Management Committee's Meeting on Friday next.*]

# School Board for London.

## REPORT OF CONFERENCE ON THE INSTRUCTION OF BLIND CHILDREN.

The School Management Committee, on the 18th July, issued the following Circular to the Members of the Board and to various gentlemen specially interested in the education of blind children :—

'DEAR SIR (OR MADAM),--The School Management Committee have had under their consideration the different methods adopted for the instruction of the Blind, and with a view of ascertaining the results of the various systems now in use, they have resolved to convene a Conference of gentlemen interested in the subject in the Board Room on Friday next, the 21st instant (July 21st, 1876), at one o'clock. The Committee will be glad if you can make it convenient to attend on that occasion.

'Faithfully yours,

'(Signed) G. H. CROAD, *Clerk to the Board.*'

The Conference was attended by the following gentlemen :— Dr. Armitage, British and Foreign Blind Association; Dr. Moon, Inventor of Moon's Type for the Blind, Brighton; S. S. Forster, Esq., Principal of the College for Blind Sons of Gentlemen, Worcester; J. L. Shadwell, Esq., British and Foreign Blind Association; R. C. Moon, Esq., Oculist, Brighton; — Marston, Esq., Undergraduate, London University, and of the College for Blind Sons of Gentlemen, Worcester; G. Martin Tait, Esq., Secretary, Home Teaching Society for the Blind, 34 New Bridge Street, E.C.; F. J. Campbell, Esq., Principal, Royal Normal College for the Blind, Upper Norwood; W. Harris, Esq., Workshops for the Blind, Leicester; James Sander, Esq., Secretary, London Society for Teaching the Blind; Mr. Mead, Teacher, Indigent Blind Visiting Society; Mr. Allen, Teacher, School for the Blind, Upper Avenue Road, N.W.; Messrs. Allen and Bush, Teachers, Home Visiting Society; Mr. Price; and Mr. Finchard, Instructor of Blind Children to the School Board for London.

The following Members of the Board were also present:—Rev. John Rodgers, M.A., Chairman of the School Management Committee; James Allanson Picton, Esq., M.A.; Professor Gladstone, F.R.S.; and Rev. Benjamin Waugh, F.G.S., Chairman of the Sub-Committee on Store and Books. Mr. Waugh occupied the Chair.

The Chairman, in opening the Conference, stated that it was called to ascertain the results of the various systems now in use for the instruction of the Blind. These facts were desired in order to enable the Board to determine the best course to adopt with those Blind children whom it was the duty of the Board to educate. The Board was endeavouring to provide a School place and School apparatus for every Blind child, to provide it in the ordinary School, but what was more to the point in this Conference, to make this provision in the ordinary class, so that, as far as possible, the Blind child may take its place side by side with its seeing brother and sister, read the same books, and be instructed by the same Teacher. He would not dwell upon the many advantages which would follow to this unfortunate part of the juvenile population if this endeavour should succeed. A serious difficulty in the way was the use of arbitrary and differing alphabets for Blind readers. Could this difficulty be removed, or could it be overcome? and if it could, would any counterbalancing disadvantages arise? Three gentlemen had been specially invited to the Conference as representing the three principal types in use for the Blind—viz., Dr. Armitage, the 'Braille' type; Dr. Moon, 'Moon's' type; and Mr. Forster, the 'Roman' type. He would call upon these gentlemen in the order in which their names happened to appear on his list. Dr. Armitage, of the British and Foreign Blind Association, was then called upon to speak.

Dr. Armitage stated, as his opinion, that all would be agreed that in many instances the instruction of Blind children in ordinary public Schools was not only possible, but desirable. Isolated cases of Blind children instructed in ordinary Schools had occurred from time to time, but the instruction of Blind children in public Schools had only become systematised within the last ten years. Under the direction of Mr. Barnhill, of

Glasgow (who was the principal originator of this work in Scotland), during the past few years about fifty children had been educated in the public Schools of Glasgow, and the results had been extremely satisfactory. In this work he very early met with the difficulty which children had in preparing their home lessons, and also in getting assistance from Teachers when using books in an 'arbitrary type,' such as 'Moon's,' which was used by the Home Teaching Society. These difficulties, and also favouring circumstances, induced him to adopt books of the Roman type, these being on 'Alston's' system, which consists of Roman Capitals. This type had since continued to be used for reading, and the 'Braille' type had likewise been used for the purpose of writing. This was the experience of Scotland. If the Board decided to be guided by it, they would adopt some kind of Roman type for reading, and the 'Braille' characters for writing. Another course, however, was open, as would be stated presently. The main thing which he understood the Board aimed at was to place the Blind children in such a position that they would benefit by the ordinary instruction of the School, and to use such a type that the books would not be of an inconvenient size. This object might be met, as he had said, by Roman type, but the principal objection to all kinds of Roman type is that it is difficult to feel. The experience in America, where the type used consists of the small letters of the Roman alphabet, was that one-third learned to read fluently, one-third learned to read by spelling their words slowly, and one-third failed altogether. He admitted, however, that the failures arose largely from imperfection in embossing. By using a bolder type the number of failures would be diminished.

Dr. Armitage gave it as his opinion that the Roman type was the most difficult of any, and he suggested as a preferable alternative that Elementary Schools should adopt the system largely introduced by the British and Foreign Association, of books printed in the 'Braille' character, with the Roman words interlined. The 'Braille' type is the only one to speak of that can be written by the Blind, and writing, he considered, was almost more necessary for the Blind than for the seeing. Whatever system is adopted for reading, the 'Braille' must therefore be adopted for writing. It would, however, simplify matters if only one type were used, which could be done by adopting the 'Braille' interlined, as he had suggested.

Mr. Tait, Secretary of the Home Teaching Society of the Blind (Dr. Moon not having yet arrived), was next called upon. He stated that he was, he thought, in some degree responsible for the movement of the Board for the instruction of the Blind. Their present plan was, he believed, to use Moon's type for reading, and 'Braille' for writing.

He could not pass unchallenged the statement of Dr. Armitage, that the 'Braille' was the only dotted type (for writing) in use, as there was also the American dotted type, which was very largely used. He considered, too, that the use of the Roman type, at least, as used at St. George's Institution, had proved to be a failure, as it was found that hardly any of the children educated there, when they grew up to manhood, continued to read it. He then requested permission for a boy, aged seven, whom he had brought to the Conference, to be allowed to read a portion from a book which he had not previously read, this boy having been trained for about a year. Mr. Tait also challenged, publicly, any one to produce a child taught on any other system, of the same age, and the same length of learning, who could read so correctly and fluently as this boy. and he also extended this challenge to sighted children. He had been taught on Moon's system.

The Chairman then gave permission for the boy (Charles Broan) to read, who was first asked his age, which he said was seven; he was also asked how long he had been at School, which he stated had been two years. He then read a portion from the book produced by Mr. Tait, which consisted of the parable commencing 'And He spake a parable unto them to this end, that men ought always to pray,' &c.

It had been found, said Mr. Tait, by the visitors of the Home Teaching Society that not a single working man who had been taught the Roman type could read it after his hands had been hardened by work. He said the Roman type was not so difficult for children, and even for men who, from their occupation in life, were able to preserve a highly sensitive touch; but for children who were to grow up as working men, it was utterly unsuitable, they would not be able to read it.

The Rev. John Rodgers asked whether it was the shape of the Roman type that made it so difficult to read.

Mr. Tait replied that it was owing to its being so confusing, and the description of the Blind with regard to it being, that it was 'like a nutmeg grater,' and added, that this remark applied to all varieties of Roman type. He pointed out the peculiarity of Moon's type to be that it retained, as far as possible, the leading characteristics of the Roman Letter, and that, instead of 26 characters having to be learned, as in the Roman alphabet, only six were required, these being placed in different positions to form the remaining letters of the alphabet. He considered that Moon's type was the most simple, most easily taught and learnt, and the only one of permanent value to the working man's child. Illustrating the difficulty of the Braille system, he stated that Mr. Allen, a Teacher of the Home Visiting Society, who was a very intelligent man, and acquainted with various systems, could write in the Braille character, but could not read it.

Mr. Forster, Principal of the College for Blind Sons of Gentlemen, Worcester, next addressed the Conference. He said he would confine himself to facts with regard to the use of the Roman type. It had obviously this advantage, that it could be read by ordinary School Teachers, which was a point before us. But, besides this, there had been considerable experience in its use in common Schools, such as the School Board had to consider. The Roman type was not only read in Glasgow, but also in America. A large number of books were still being printed in both places. At his own Institution, at Worcester, not only large, but also small Roman types were used, and not one boy who came there failed to learn either one or the other. There was no difficulty in a child learning the Roman type who commenced at the age of seven, the age at which the Board would probably have had the child some time under its care, and at the age of twelve it would be able to read exceedingly well. The education of the Blind was commenced at Worcester in 1868. The stereotyping of their books was not all that could be desired; but the Society was somewhat poor, and had not been able to renew the plates as they had wished and still hoped to do, and this accidental circumstance rendered the feeling of the letters more difficult than it ought to be and might be. It was, however, a positive truth that, disadvantages notwithstanding, the Roman type could be read. Some of the pupils of the Worcester Institution could read so well that they were able to stand up in Church and read the lessons for the day, which, he considered, was all that could be desired. This was done from their own type. Mr. Forster stated that Dr. Armitage did not mention the ages of those who failed to learn the Roman type in America. In nearly all Institutions for the Blind in America, the age at which pupils were admitted was eleven and upwards; and whatever conclusion might be drawn from their case would not apply where, as in the case before us, education was to begin so early as five years of age, or perhaps before. In American Institutions pupils were even admitted at such ages as 24, 34, 40, &c.

In reply to the Chairman, Mr. Forster stated that in the Worcester Institution they had, in a sense, experience of all systems of type; but that, though all systems were taught, they were taught to almost every pupil, so that no comparisons could be made. The Roman type was the first a child learnt unless it knew another when admitted to the institution.

The Chairman inquired whether they had means of ascertaining if there were any differences in the ease with which pupils retained their ability to read different systems.

Mr. Forster replied that they had not.

The Chairman: It has been stated by Dr. Armitage that one-third of the Blind pupils of America (who are taught on the Roman system) had failed. In our own country, until recently, the statistics of ordinary Day Schools for the sighted presented, rather curiously, a somewhat similar result. But this was not usually regarded as an argument against Roman type. Could anyone say whether in America the general School statistics showed a similar proportion of failures?—None present were able to say.

Dr. Armitage observed on Mr. Forster's remarks on the point of the ages of the pupils in American Institutions, and its bearing on the number who failed to learn to read in them, that he was uncertain as to the particular ages, but the pupils were children, not adults. In reply to Mr. Tait, he stated that the Braille was the only dotted type used in Europe. It was also used in Boston (U.S.) and in Australia; and of the Institutions for the Blind in England, about one-half used the Braille type.

Dr. Moon, of Brighton, stated that, when his type was first introduced, although the Roman type had then been in use for a number of years, there were not more than 150 Blind working adults in this country who could read; now there were more than 5,000. When the Blind began to work, they began to loose their ability to read. Eighty or ninety in every hundred were unable to read the Roman letter when they began to work as basket makers, &c. The Braille type was too small for working adults. He stated that his (Dr. Moon's) type was so simple, and so easily learnt, that it could be acquired by the Blind in a quarter of an hour, and almost any number of seeing persons could be taught together, and with equal rapidity.

Mr. Harris, of Leicester, stated that he was perfectly disinterested as far as all Institutions and Charities were concerned. He looked upon himself as a juryman on the question of the Education of the Blind, having had the evidence placed before him, and read every book on the subject. He considered the Board had to do with children, not with adults. (The Chairman interposed—The Board has to do with children as to learning, but with adults as to retaining.) Yes, the question ought to be fairly considered in that light, and not settled narrowly or hastily. The more Blind children had to do with sighted children the better. They ought to have books which would enable them to get assistance from home, and from their sighted companions. If they had books in the Roman type, the Blind children would also be able to teach their brothers and sisters who could see. He stated that he was not interested in any type, but he had a leaning to the Roman. It was the oldest, most well known, and the most permanent, that it would not change, and was likely to last as long as the world. New types became fashionable, and were liable to alteration. There were already two systems of Braille, and also abbreviations. A new type would come up and override everything for a time, as, for instance, Frere's system, for which large sums of money were contributed, and in which system many books were printed; but at his death it was discontinued, and, he believed, no book had been printed in that type for some years. With the view of saving the Blind from the immense disadvantages of these varied and varying characters, he sincerely hoped that the ordinary and venerable English character might be adopted. He considered that whatever type children learnt first they would stick to. The Roman type had not flourished in this country, but he attributed this to want of funds to enable the production of sufficient literature in it. At first, the promoters of this type had sufficient money, but other types sprang up and this system became neglected. A larger, sharper Roman type was wanted, well printed, like Moon's, on good paper, like Moon's; skilful and trained workmen were also wanted, and who should be kept continuously at the work. He attributed the success of Moon's type to the success of Moon's cause. It was essentially a religious one. It had aroused Christians to move in it, and God had blessed it. In estimating the value of the fact of the prevalence of Moon's books this must not be forgotten. Moon's type had also its advantages—it was similar to the Roman in having no abbreviations. A great number of books had been printed in Moon's type, but for the reason just named these were mostly religious; very few were in standard or general literature. His library of books being larger than any other, and because of the particular kind of books to be had in it, it had, naturally, the most patronage. Special teachers were required to teach Moon's type, which was a point in question, but to teach the Roman, this was unnecessary. Blind teachers were not always the best teachers of the Blind. If books in use in public Elementary Schools were provided for the Blind children in the raised Roman character, they could be taught, as the Board desired, along with the sighted children.

In using their influence for the adoption of the Roman, the Board would use it in the direction of one universal type, and in this they would be assisting the rich as well as the poor. Until one type could be adopted, part of the small library of literature for the Blind would always be practically in some other than the language with which they were familiar.

Mr. Mead, Teacher of the Indigent Blind Visiting Society, stated that he would contribute his varied experience to this very important question. He lost his sight at the age of 19. He first learnt Moon's system, which he did in one evening, without assistance. He afterwards joined the Home Teaching Society. He learnt a second system, 'Frere's Phonetic,' which he considered to be a failure. It was bad for spelling. He next learnt Lucas's. On first acquaintance he considered that system to be the best, but he found that it could only be used by a certain number of the 'clear-headed' Blind. He next learnt the dotted system of Braille. He thought Braille's dotted system to be superior to the American dotted system. At length he returned to Alston's, the Roman, system, for that was, of course, the system on which he read when he had his sight. That system he liked, but these books were badly produced. Children, having learnt in Roman, easily pass from it to Moon's system, but they would not wish to do so if they had plenty of good literature in Roman type. To turn for a moment to writing, it was useless for Blind persons to send a letter in Braille to sighted persons, but it was not useless in Alston's type. Braille should be used for correspondence amongst the Blind themselves. He agreed in the opinion that the large use of Moon's type by the poor Blind was owing to the supply of literature carried to them in Moon's.

The Chairman asked whether it was Mr. Mead's opinion that the Blind could continue to use Alston's system if they were supplied with literature in it.

Mr. Mead replied yes, in many instances, but he considered Moon's type was the more easy for adults.

The Chairman: Do you think that arises in any degree to the peculiar sharpness with which Moon's letters are printed?

Mr. Mead: Partly.

Mr. Campbell, Principal, Normal College and Academy of Music, Norwood, stated that Blind children learned Roman type in 45 minutes, and that he himself had used it all his life. He knew, however, the Moon and Braille types in addition to the Roman, and he preferred Moon's. The standing which the Roman type had obtained in America he attributed not to its merits but to the energy and ability of Dr. Howe, its chief promoter. Dr. Howe, in America, crushed down everything else. Roman types, he believed, would now go down, as Dr. Howe was dead. In America they were now printing Moon's books very rapidly. We must have a dotted type, as Braille. Also, a line type for the adult Blind, and Moon's was the best. The Board ought to have the very best teacher that could be obtained.

The Chairman observed that he supposed Mr. Campbell's remark applied to special Blind teachers, and that the question just now was, whether the Board could altogether dispense with speciality in Blind instruction, and place Blind children under the ordinary Board School teachers.

Mr. Allen, Teacher, Home Teaching Society, stated that twenty years ago he became blind, that he bought a book and learnt Moon's system in twenty minutes. He considered Moon's system very easy, and to be easily taught. He had heard of many who had learnt Alston's system, but had not heard of any who could read it easily.

Mr. Allen, Teacher, Upper Avenue Road, considered Braille the best system, as it was adapted both to reading and writing.

Mr. Shadwell, British and Foreign Blind Association, had taught on the Moon, Frere, and Braille systems. The Association was formed to settle the question of the best type for the Blind. He said that, if we were to have one system only, Braille was the best. If two systems, Moon and Braille. Moon's, though easy, was not so comfortable ; it was very fatiguing, owing to the space to be travelled over by the finger in reading.

Mr. Tait asked whether the British and Foreign Blind Association was not founded to settle the best system for the Blind, and what had been its decision?

Mr. Shadwell replied that the Association had been founded for that purpose, and that it had fixed on Braille and Moon.

Mr. Marston, of Worcester College, Undergraduate of the Dublin University, stated that at Worcester College they read Moon's, Roman, and the Braille systems, but that Moon's system was not retained by many unless brought up solely in that system. He considered that, for quick reading, the smaller Roman type was the better. To those who could read it the smallest type was the best. Children could be taught any type if it was well printed and they had good teachers. Children, at five or six years of age, could read easily any type, even the small Roman type. To get the literature of the Blind into the settled characters of the country, would be an emancipation for the Blind. It was appalling, the needless exclusion of Blind children, alike at home and in school, from the occupation and pursuits of the sighted; and this matter of literature, and especially of School literature, was amongst the causes. He mentioned that, so far as age was concerned, he had seen men of, say, from fifty to sixty, in Worcester, reading Roman type which had been learnt in the later years of their life. He thought the space required by the characters of Moon's system a serious objection. The Blind Bible in Roman type occupied eight volumes; in Moon's type, sixty-four volumes. That entire difference might not be owing to difference in type, but it was to a very large extent.

Mr. Moon, jun., stated that there was not more than one Blind person found in Paris who could read in the Braille type.

Mr. Finchard, the Board Instructor of the Blind, said on the age question and Roman type that he could read the American system slowly, but Moon's more quickly. Braille was necessary for writing. One child (a Board scholar) he had taught had written a book of fifty pages in three weeks.

Mr. Bush, Teacher, Home Visiting Society, lost his sight at the age of eight years. He read Frere's system for six or seven years. Learnt Moon's in half an hour. He was in St.

George's Institution, where several of the inmates read their books in Alston's type.

The Chairman then thanked those present for attending the Conference, and for the valuable information which they had communicated. He said the statements of facts and opinions which had been made were exactly what the Committee desired to obtain. The point before the Board was not simply how to educate the Blind children. It was narrower than that. It was how best to educate them in the ordinary School and in the ordinary class of the School. The Committee would meet and consider this question in the light of the valuable information now laid before them.

Mr. Tait proposed a vote of thanks to the Board for calling the Conference, and also to the Chairman of the Conference for presiding, which was seconded by Mr. Forster, and carried unanimously.

(Signed) BENJAMIN WAUGH, *Chairman.*

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# School Board for London.

## *School Management Department.*

# INSTRUCTION OF THE BLIND.

The following were the conclusions arrived at by the School Management Committee of the Board, after a careful consideration of the opinions expressed at the Conference held at the Board Offices, on July 21st, 1876, for the purpose of inquiring into the various systems employed in the instruction of the Blind in reading. The Conference was attended by representatives of the various systems, and by several members of the Board.

'(i.) That one uniform system for reading-books for the Blind is much to be desired.

> '1. The effect of the present diversity is to divide into various conflicting channels that charity by which alone books for the Blind are produced, and thus seriously to limit the practical benefits of that charity to the Blind themselves.

'2. Because the small supply of literature for the Blind by this diversity is practically rendered still smaller. To individuals that small supply consists of two great classes—a class on a system which they can read, and a class on systems which they cannot read.

'(ii.) That the system in use for the Blind should be, with possibly very slight modifications, the same as that in use for the seeing—viz., the Roman. Whilst some advantages appear to belong to each of the other systems, and some disadvantages appear to belong to the Roman, yet, on the whole, the Roman character is most desirable.

'1. Because it is the accepted character of the country, and therefore is most favourable to unity.

'2. Because children appear to acquire and, with well-printed books, to retain in manhood their power to read it.

'3. And especially because, with books in this character, ordinary School teachers could everywhere teach a Blind child, and ordinary persons could everywhere help a Blind child. The unfortunate child would be, so far, in the natural course of things.

'(iii.) The Committee are further of opinion that it is not in the power of the Board to do more than record these conclusions, and then accept the present state of things. They, therefore, recommend :—

'1. That, as books in the Roman character are at present somewhat imperfectly produced, and as books in Dr. Moon's character have been already partially adopted, the use of Dr. Moon's books in the Board classes for the Blind be, for the present continued.

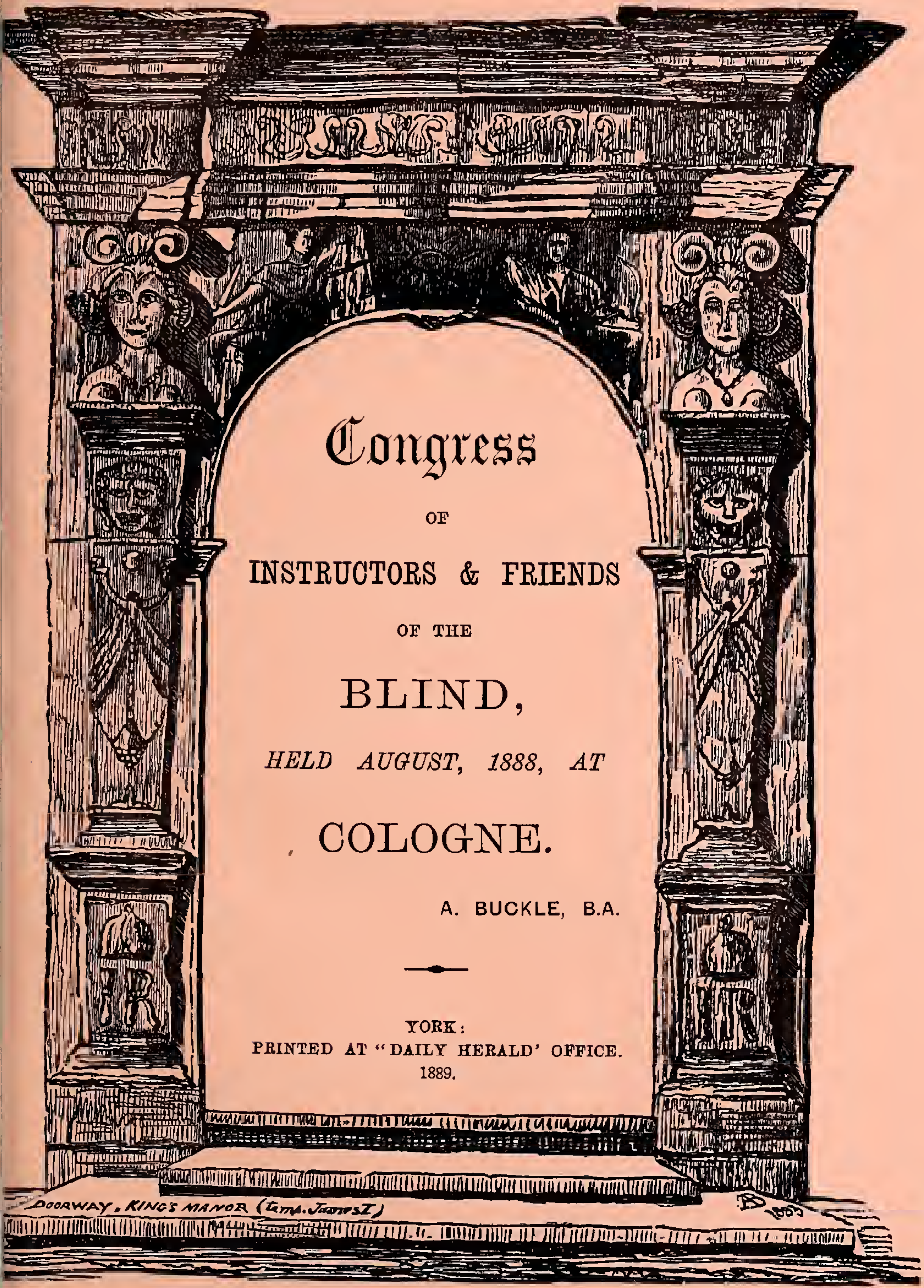
'2. That the Committee be authorised to procure books in Roman type for experimental use.'

The Resolutions adopted by the Board were :

'1. That for the present the use of books for the Blind, in Moon's characters, be continued.'

'2. That the School Management Committee be authorised to procure books for the Blind, in the Roman type, for experimental use.'

G. H. CROAD, *Clerk of the Board.*


DOORWAY, KING'S MANOR (temp. James I)

# Congress
OF
# INSTRUCTORS & FRIENDS
OF THE
# BLIND,
*HELD AUGUST, 1888, AT*
# COLOGNE.

A. BUCKLE, B.A.

YORK:
PRINTED AT "DAILY HERALD' OFFICE.
1889.

# BLIND CONGRESS AT COLOGNE, 1888.

*To the Committee of the Yorkshire School for the Blind.*

GENTLEMEN,

The Sixth Triennial Congress of Managers and Teachers of Blind Institutions was held at Cologne, from the 6th to the 10th of August last. As your representative, I had the pleasure of attending, and of renewing my acquaintance with many earnest and enthusiastic colleagues. Upwards of 100 Members took part in the Meetings; nearly every German and Austrian Institution sent one or more representatives. The other countries represented were Belgium, Denmark, England, France, Holland, Russia, and Switzerland. Four Members of the English Royal Commission, with their Secretary, were present.

His Excellency The PRINCE OF WIED, as representing the Government of the Prussian Rhine Province, was Honorary President: the acting President was Director MECKER, of the Düren Blind Institution, with Directors MEYER, of Amsterdam, and WULFF, of Steglitz (Berlin), as Vice-Presidents.

Valuable papers on the most important subjects connected with the education and training of the blind were read and discussed, and well-digested reports were received from several Sub-Committees. I propose to give what seem to me the salient points of the most important.

Director MECKER, in his opening remarks, struck, I think, the right key-note of the meeting in the following words:—"But, my esteemed colleagues, we are but few and our powers are but weak, our work will be only imperfect if we do not find help and support from the people and from the Governments; and, God be thanked, pity has not yet died out of the human heart, but Christ-like love is still wakeful there, and humanity still shews much preference for the blind. To these, then, we turn, but we do not beg like the blind man on the road to Jericho for simple alms. No, we proclaim here, on behalf of those committed to our charge, their *right* to education and to work, and only so far do we ask for special support as is necessary to wipe out the disadvantage, in which the blind man is placed by his defect in competition with the seeing. And, we believe, our appeal will not be made in vain."

Director WULFF, of the Steglitz Blind Institution, near Berlin, read a long and very instructive paper on "Occupation and Life of the Blind." His opinions and experience are valuable. The following passage exactly corresponds with my own opinions and experience, and met with general approval: "It is not difficult to educate the blind in the various branches of handicraft usually taught, much more difficult is it to secure for them the opportunity of employing profitably their acquired powers after they leave us, and this, in regard to the care of the blind, is of even greater importance than the education in the Blind Institution. According to my experience, blind handicraftsmen succeed the best; they are able to maintain an independent existence, and in the smaller towns, as workmen and shopkeepers, to reach a position of some comfort. Females, too, as brush-makers, succeed better than in the usual female occupations, knitting, &c.; yet, in consequence of their natural weakness, they cannot so easily succeed in maintaining their independence. On this account, a sort of Blind Home in the neighbourhood of the Institution is the best for them. Here they could pay for their maintenance by the profits on their work, which could be sold at the Institution."

The question of types was discussed, and the following resolutions prepared by a Sub-Committee were adopted by the Congress:—

1. The point and line system for printing and writing are to be retained. Preference should be given to the point system over the line system for printing and writing.

2. The double-sided system of point type should be used for the printing of German books as well as for writing. Only a few school books need be issued in the line system.

3. Reading and writing should begin with the point system. Flat writing (that is, with lead pencil,) should not be commenced until the pupils have made sufficient acquaintance with the shapes of the letters in the Roman type.

4. It is desirable that shorthand should be tried in the upper classes of all Blind Institutions.

5. It is desirable, in the interests of the seeing-teachers, that all school books in the point type should also be published in ordinary type.

Our good friend, Mr. MOLDENHAWER, the Director of the Copenhagen Institution, read a practical paper on what he denominated "The Spontaneity and Initiative of the Blind." I quote a few sentences from it.—"The main object of all education is spontaneity, which, in consequence of their defect, is difficult to attain in case of the blind. In the case of the seeing, the surroundings and requirements of home promote it; in the case of the blind, the Institutions must do it, and not only provide a general education, but also a means of earning a livelihood, and in such a way that on leaving the School the pupil must be a finished, independent, and well-prepared workman. Hence he should be put to his trade early. His trade should be suitable to his tendencies and abilities, and selected by the advice of his parents. In all ways the spontaneity of the pupils should be promoted, such as in correcting their own exercises, in making purchases, in keeping clean and in good order their clothes, and in teaching other neglected blind companions. Also, after they have left the Institution, as wide a field as possible should be left for the spontaneity and initiative, so that they may have constant opportunity for further effort. No pupil should have a fixed certain support from the Assisting Fund, so that he may not be induced to let his hands hang idly by his side."

Gymnastics for the blind received their due consideration, and the value of them as an educational agent was duly insisted upon.

The following principles were submitted by a Sub-Committee, consisting of six of the most prominent Members, and were adopted by the Congress :—

### PRINCIPLES TO BE ADOPTED IN PROVIDING FOR THE BLIND.

1. All young blind, as soon as capable of receiving instruction, should be received into special Institutions, in which the methods of education and instruction are arranged so as to overcome the bodily and mental defects resulting from blindness, and to train them for human intercourse and for earning a livelihood, according to the acknowledged experience and principles of blind education.

2. In every State a sufficient number of Blind Institutions should be erected and maintained to accommodate all blind children capable of education.

3. Until blind children can be received into such Institutions, they should be compelled to attend the ordinary Elementary Schools; but neither the Elementary Schools, nor special classes for the blind attached to such Schools, should be substituted for the special School.

4. It is desirable that the attendance of blind children at Blind Institutions should be regulated by a special law.

5. All Blind Institutions should be arranged so as to provide a general school education and a special training in some handicraft.

6. The number of pupils in a class under one teacher should not exceed fifteen. Pupils entering an Institution late in life should not be allowed to mix with the younger ones. A special section should be arranged for the weakly-endowed pupils.

7. Trained pupils after leaving the Institution should be aided with advice and means in attaining positions of independence. To this end supporting funds should be started.

8. Educated and trained pupils gain their livelihood most successfully according to their ability and local opportunities, in the first place in free independence, in the second place in workshops, and lastly, especially blind females, in Blind Homes. For old blind people unable to work and in need, only Asylums can be recommended.

It appears to me that the reasonableness and the soundness of these views is confirmed by the experience of all who have worked in Blind Institutions.

A Russian representative, VON NADLER, reported on the progress of blind education in Russia, since the last Congress at Amsterdam, in 1885. He stated that in the last three years nine new Blind Institutions had been opened in Russia, viz., three Asylums, two Workshops and four Educational Institutions. Private individuals had bequeathed 105,000 roubles (£16,625) for the blind; but the Society under the patronage of the Empress had accomplished most. The Emperor has presented an estate worth 300,000 roubles (£47,500) to the cause, together with a sum of one million roubles (£350,000) as an endowment, in memory of his mother, the late Empress Maria. There are now in Russia twenty-eight Institutions, with 822 pupils. There remains, however, much still to be done, for there are probably not less than 120,000 blind in that vast empire of 100,000,000 souls, of whom only three per cent. have any fixed occupation. Still the Congress felt that a good beginning had been made, and the active and beneficent patronage of the Imperial Family will doubtless act as a good stimulus for the future. The Congress, therefore, sent a telegram to the Emperor expressing the thanks of the Members, which in due course was graciously acknowledged.

In connection with the Conference there was an Exhibition of apparatus, books, models, raised maps, &c., for the instruction of the blind.

The raised maps of Mr. KUNZ, of Illzach, were undoubtedly the best exhibited, for which he was awarded a gold medal. COUNT COVACO, of Russia, exhibited a machine for writing Braille, both ingenious and practical.

Mr. WAGNER, from Switzerland, had for exhibition a similar, but more complicated and yet a more complete apparatus for the same purpose. With this machine both Braille or ordinary type can be written. A machine for stereotyping Braille seemed to me a very valuable instrument.

Fine examples of modelling by the blind were also shewn from Vienna Jewish Blind Institution, and also from Dresden.

It seems, Braille writing having become universal, that we shall have for many years inventions tending to simplify the writing of it, and one hopes that the cheapening of literature for the blind will be one result.

## THE INSTITUTION FOR THE BLIND, DÜREN, WESTPHALIA.

On the 9th of August we went an hour's journey by train to visit the Provincial Blind Institution, at Düren. As this is one of the best Schools on the Continent, I have thought it well to give the following short account of it:—

The Düren Institution for the Blind is the only one in the Rhine Province. Its object is, by means of general school instruction, and by special training in some trade, to train all the blind in the province, numbering about 200, as useful members of the State. It was founded to commemorate the event of the visit of King Frederick William and his queen Elizabeth to the Rhine Province, in the first instance as a private Institution (*i.e.*, not a State Institution), under the name of the Elizabeth Foundation, and was opened with seven pupils in 1845. The attendance, which in the first 12 years amounted to 20, rose in 1868 to 55. About this time it had been raised to a Provincial Institution, receiving an annual grant from provincial funds. In 1873, the Provincial Government took the management of the Institution into its own hands, and since then it has provided for all the necessities of the School, so far as they are not covered by interest on capital, and payments of the pupils. A new building was at once erected, and with the Institution was connected a local workshop, in which those who had lost their sight late in life might be taught some handicraft, and in which, in some cases, they might find constant employment afterwards. The attendance in 1876 rose to 120, and in 1878 to 150.

According to the regulations now in force, all poor pupils are admitted to the School free, their parents or friends being only put to the cost of providing clothing; pupils in the workshops are paid for by the parishes, to the amount of not over £20 a year. Pupils of means pay sums varying up to £20 a year.

The Institution numbers at present 154, viz.:—101 males and 53 females; of these 24 over 20 are in the workshops and 130 in the School proper. The 130 are divided into five classes, viz.:—Four School Classes, of from 15 to 20 each, and one Training Class, of about 60, for handicrafts.

The School Classes receive from 28 to 32 lessons a week in school subjects, and from 12 to 14 exercises of manual dexterity. The Training Classes have 45 lessons in handicrafts, and from 8 to 10 in perfecting school work; while the Workshop Classes have 54 hours' work in handicrafts, and only a few hours in singing or being read to.

On the first of last October, a Preparatory School was to be opened, to accommodate 20 pupils of six years old, with two teachers (one for Kindergarten), and one attendant, thus raising the number to 175.

The School Instruction includes religion, reading, writing (lead pencil and Braille), object lessons, arithmetic, history, geography, natural history, singing, music, gymnastics, kindergarten work, drawing, and modelling.

In the Handicraft and Workshop Department are carried on basket-making, rope-making, brush-making, chair-seating, mat-weaving, netting, knitting, crochet, sewing, and music, with pianoforte tuning. Pupils of means, who possess sufficient ability, have the opportunity of preparing in the upper classes of the Institution for the higher or University education of the country.

The Staff and Household comprise:— One Director, four School Teachers, one Professor of Music and three Assistants; one Protestant, one Catholic, and one Jewish Teacher of Religion; five Teachers of Handicrafts, five Attendants (male and female), who also help in the workshops; one Steward, one Accountant, and 11 Domestic Servants, as well as one Surgeon, and one Ophthalmic Surgeon.

A fund for helping the former pupils of the School was started in 1868. The Institution maintains an active connection with these former pupils, watches over their conduct, and seeks in all possible ways to promote their industrial activity. It provides them, on leaving school, with tools and materials, and fits up a shop for them; it sells them materials at cost price, purchases the wares which they cannot otherwise dispose of, and, in case of sickness or misfortune, yields them material help. The Director visits them at various times in order to become acquainted with their circumstances, and to promote their interests on the spot.

In the State year 1887-8, there was expended, in aiding former pupils, the sum of £520, and a further sum of £45 was lent to three of them, free of interest. This sum of money was provided, in the first instance, by the valuable fund already referred to, which is under the management of the Institution, and which at the end of 1887 reached over £4,500; and secondly, by a "Society for assisting the Blind of the Rhine Province after they have left the Blind Institution." This Society is spread over the whole Rhine Province, and numbers 190 Districts, with 8,067 Members, whose contributions last year produced the sum of £1,250.

The total number of former pupils who have been trained here is 460. Of these, 62 left on account of either bodily or mental weakness, 91 have died, 18 are in public almshouses; the remaining 289, in one way or another, as assistants, or journeymen, or with their relations, are to a greater or less extent partly or fully maintaining themselves, viz.:—55 as Basket-makers, 10 Rope-makers, 10 Brush-makers, 65 Chair-repairing, Shoe and Mat-weaving; 30 Musicians, Organists, and Tuners, of whom nine are Organists in Churches, and two Music Teachers in the Blind Institution; four give private lessons in Languages, one Mayor, three Merchants, one Watch-maker, four Hawkers, and 95 females in female handicrafts; two are wandering Musicians, and as such are excluded from the help of the Fund. There are in the province 5 ordinary workshops, with two blind men employed, 1 with five, and 1 with 14.

Our visit to this fine Institution, which seems in all its branches, and neglecting none, to be doing its work so well, will, I think, remain in the memories of all as one of our pleasantest experiences. On our arrival we went through the various rooms and departments. The building erected for the purpose seemed thoroughly well arranged. The basket work, which was good and very cheap, did not seem to come up in quality to our own. The knitting and crochet work of the girls was specially good, but several of the girls are retained to a much later age than ours, and consequently can produce better work.

When we had perambulated the whole Institution, we gathered in the music room, where we were entertained with a recitation in the form of a dialogue between personifications, by three of the elder girls, of Light, Night and Religion, which was introduced and concluded with music composed, as well as the recitation, for the occasion. Many allusions in it called forth hearty applause, and the whole piece was instructive, stimulating, and to our blind friends consoling. Several other pieces of concerted and solo music were charmingly rendered by the pupils, and none more so than Mendelssohn's sweet air, "I waited for the Lord," which, though with German words, carried us away to the music room in York, and our memories back to one who used to sing it so sweetly there; but a further, and if possible, a greater pleasure awaited us. From the music room we went out into the beautiful grounds of the school, where we found the band of the Institution, consisting of six violins, two violas, two cellos, one double bass, six flageolets, two flutes, nine brass instruments, drum, cymbals, triangle and kettledrum, arranged in a circle. Sixteen of the elder girls then made their appearance, all neatly dressed in black stuff, who arranged themselves in fours at a short distance from the band, which then played a lively air, partly dance, partly march. Then the girls, blending their sweet voices with the band, began and went through a sort of simple quadrille. It was now towards the evening of a hot day; the Members of the Congress and friends of the school were gathered around in groups under the shade of the trees, all enthusiastically intent on the scene before them, and charmed with the sweet strains of voices and instruments. The whole was an idyllic scene never to be forgotten, the memory of which will probably be more lasting and precious than that of the sumptuous banquet which followed, provided for the Members by the Government of the Province.

The last function of the Congress was a pleasant afternoon trip by rail to Bonn, thence by steamers on the Rhine to Königswinter, whence we ascended the well-known Drachenfels, one of the seven mountains. Here spread before us one of the loveliest prospects in Europe, which, needless to say, we all enjoyed for about two hours. We returned to Cologne in one of the fine Rhine steamers in the pleasant summer evening, and then bid adieu to each other in the hopes of meeting at Copenhagen, in 1891.

[*I have since learnt that the next Congress will be held at Kiel, and not at Copenhagen.*]

# EDUCATION OF THE BLIND.

BY

ROBERT HUGH BLAIR, M.A., F.R.A.S., &c.,

RECTOR OF ST. MARTIN'S, WORCESTER;

EXAMINER AND LATE PRINCIPAL OF THE COLLEGE FOR BLIND SONS OF GENTLEMEN, WORCESTER.

*(Read at the Meeting of the National Association for the Promotion of Social Science, held at Birmingham, October, 1868.)*

RE-PRINTED BY PERMISSION.

WORCESTER: DEIGHTON & SON.
LONDON: SIMPKIN, MARSHALL, & CO.

1876.

PRICE THREEPENCE.

# EDUCATION OF THE BLIND.

THE first known endeavour to present the blind with readable characters belongs to the sixteenth century, when letters were graven in separate blocks of wood. In 1575, Rampazetto produced wooden letters in relief, not separate, but in a stereotyped form. Both of these were laid aside as too cumbrous and expensive, and, in 1640, Peter Moreau, of Paris, cast letters in lead; whilst, in 1783, M. Fournier cut punches and struck matrices, in which type were cast and printed from, at the expense of M. Rouillé de l'Etrang, Treasurer of the Philanthropic Society in Paris. The invention of printing in relief on paper cannot, however, be said to have taken place till M. Haüy established, in 1784, the first European Institution for the Blind, and set up a press for embossing. The characters he adopted were Italic, well separated, and of a size easily distinguished by touch. The first attempt to form an arbitrary character is due, I believe, to two blind men of Edinburgh, McBeath and Milne, who formed a string alphabet, the letters being represented by a succession of knots in combination. It seems probable that this strange endeavour was suggested by some report of the "Quipos," or knot records of Peru, in which the history of that country was preserved long before the discovery of America by the Spaniards. An account of these "knot records" was published in London in 1827, about which date the string alphabet was introduced. The next arbitrary type was that of a Mr. Hay, who in a very able work endeavoured to show the impracticability of letters with inclosed spaces, and consequently invented characters all open to the touch. This system formed the subject of a discussion by the Royal Society of Arts of Edinburgh, who had formerly considered an invention of Mr. Gall. Mr. Gall, improving upon his former invention, produced a system consisting of modified Roman characters, angularized, which he supported by such strong arguments in favour of the adoption of a type capable of common use, that this Society decided to offer a prize for the system the best suited to universal adoption. Sixteen competitors sent in specimens of type, which, in many cases, were accompanied by apologies of much ingenuity and philosophy. Mr. Taylor (whose paper on Colleges for the Blind you have just heard), at that time Honorary Superintendent of the since celebrated York Asylum and Honorary Fellow of the Royal Society, was chosen arbitrator of this difficult question. The investigation, involving immense labour and patient plodding through long explanations and arguments, occupied some months. At last the Society published Mr. Taylor's Report, which decided in favour of

Mr. Fry's Roman Capitals, devoid of seriffs, and opened in some cases to the touch, since known by the name of Alston's. Of the sixteen specimens sent in four survive, if we may count Gall's in the number—three slightly modified Roman, and one arbitrary. The Roman are Fry's, Gall's, and Howe's of Boston; the arbitrary, Lucas's. In 1835, Dr. Howe of Boston published a system of semi-angular lower-case Roman, called in German the "Halbeckige," small, sharp, and beautiful in form and appearance. About the same time the Gospel of St. Mark was published in Philadelphia, printed on both sides of the leaf, in a type between written and Italic characters. At this point we mark a new phase in printing for the blind. The director of the New York School, and M. Barbier of Paris, both conceived the idea that the blind ought to read a phonetic system. Two phonetic systems, therefore, were added to the list, neither worth describing, but of which the French one seemed the least bad and most ingenious. Mr. Frere, of England, is the father of the only phonetic system now living in this country. Mr. Lucas's system, which has already been alluded to, represented another variety of printing in relief, viz., a *stenographic* one. The Abbé Carton, of Bruges, subsequently added to the semi-arbitrary characters a dotted type, fifteen of the letters being modified Roman, eleven arbitrary. This system now prevails in Belgium. A blind teacher of the Institution of Paris, Louis Braille, so early as the year 1836, had invented a system of characters in dots, entirely arbitrary, which by degrees thrust out the Roman or Italic characters from France, and is now in universal use in that country. In Germany, a style of embossing, called the "Lapidar Druckschrift," is all but general. It is a dotted Roman, easily distinguishable by touch, and plain to ordinary readers. There is but one more system to be mentioned, and that belongs to England. This is, I believe, the latest effort to enable the blind to read with ease. I refer to the partially arbitrary characters of Mr. Moon, of Brighton, a blind gentleman, who sent forth an invention which is a great favourite with many, and the introduction of which over the whole world is, I believe, the one aspiration of Mr. Moon and his faction.

From this rapid sketch it will be already inferred by you that the actual state of blind typography is this: the blind of England possess four systems, viz., Lucas's, Frere's, Moon's, and the Roman. France has one system, that of M. Braille. Belgium also one, that of the Abbé Carton. That of France is purely arbitrary, of Belgium partially arbitrary. The States of North America have two Roman systems, Dr. Howe's and the Philadelphian. Germany has, almost entirely, the "Lapidar Druckschrift" of Stuttgardt, or dotted Roman capitals. Austria has a very small lower-case Roman, with capitals. Russia has, I believe, some systems of Roman. Italy and Spain, Roman. In a very few instances Moon's system has found favour abroad, but in the only cases which have been made known to me in reports from Germany, it has been expressly stated "for very hard hands, or old people."

Now in comparing the living systems it is necessary to enumerate but ten of all that have been tried. These are as follows :—

A. Of characters entirely distinguishable by common writers.

1. Dr. Howe's, of Boston, angularized lower-case, the size of each letter, which does not rise above or below the line, being 3-16ths of an inch exactly.

2. That of Fry, commonly called Alston's, plain Roman capitals, size as used at St. George's Fields' School, 3-16ths of an inch. A smaller is also sometimes used.

3. Higher and lower-case Roman, as used in the celebrated Blind Institute of Vienna, under the direction of the learned M. Pablazek, and as used in the College for Blind Youths of Rank at Worcester. The size, 3-16ths and 5-32nds of an inch.

4. Higher and lower-case slightly modified Italics, similar to that used by M. Haüy, of Paris, l'Institut des Aveugles, and at present used in the school at Milan, ascribed to Dr. Lachmann, but really due in a form nearly identical to M. Haüy. Both of these in size are 1-8th of an inch.

B. Those which are partly arbitrary, partly Roman.

1. Gall's, of Edinburgh, the characters of which are generally recognisable to common readers, the form being angularized Roman, some higher, some lower-case. Four letters of the whole are incognisable to an ordinary person. The size is 3-16ths of an inch full.

2. Mr. Moon's. The characters are described by M. Pablazek as "Das runenschriftartige, grosstentheils aus den elementaren Strichen der romischen Majuskeln gebildete System von Moon zu Brighton." Twelve letters of the whole are modified Roman, easily read by ordinary persons, fourteen arbitrary. The size of the characters is fully 1-4th of an inch.

3. The "Punktschrift" of the Abbé Carton, of Bruges. Each letter is composed of raised dots, and sixteen characters of the whole are modified Roman, easily distinguishable by ordinary readers; the remaining ten are difficult to make out. The size is 3-16ths of an inch.

C. Systems purely arbitrary, containing no known elements for common readers.

1. The Stenographic of Lucas. The elements from which the whole alphabet is composed are but three in number—a curve, circle, and straight line. The spelling adopted in this system is almost as arbitrary as the forms of the letters, and numerous contractions are made use of. Size, 1-4th of an inch.

2. The Phonetic of Mr. Frere. The elements of this system are also three—the curve, circle, and straight line. The spelling is, as the name indicates, according to sound.

3. The Punktschrift of M. Braille, of Paris. The one element in this system is the raised dot.

Now I have been compelled to name all these systems, because each one is in use; yet, by way of simplification, I will reject from our consideration those systems which have the fewest friends, as being by almost general consent out of competition—viz., Gall's, Lachmann's, and Frere's; although I must say that I consider Gall's and Lachmann's are far superior to some of their more successful rivals.

Two ways of weighing the question at issue between the systems are at once suggested, viz., on the broad basis of a universal and well-known *versus* an arbitrary and unknown; and then on the relative merits of individual forms of type.

First, then, is any one of the seven remaining systems excluded from competition by the complexity of its form or size? The answer to this is prompt. There can be no weaker nor more false argument than to assert that this or that system is the only one the blind can read with ease. Any of the systems can, with almost an equal amount of practice, be read with fluency and comfort. If a proof is asked of this, I give the very palpable one, that each system has its ardent advocates, who are prepared to furnish evidence, and abundant evidence, of the legibility of their favourite system. The powers of the blind are sadly underrated and belied by those who would have us believe that any one of the seven systems received is beyond their tactile comprehension. Allow me to quote, relative to this matter, a few words by a Mr. Lothian, given in Mr. Taylor's report, before alluded to:—"Touch having become, even in very early life, to a great extent, a neglected sense, it is impossible for those who enjoy the sense of sight, all whose ideas of reading are connected with a visible language, to imagine to what extent of excellence a tangible one may be carried. Now it is well known that the extinguishing of one sense leads to the great improvement of the others. It does so just because it makes necessary their greater cultivation. The touch, which to us conveys a vague impression of feeling towards the termination of the fingers, and is too general, therefore, to suggest the figure of the object touched, is felt by the blind on the precise parts of the finger affected by the different parts of the object. The relation of the different minute parts of the finger to one another comes, from practice, to be accurately known to the blind, and the simultaneous affection of different points, therefore, immediately suggests the relation of those points, and consequently of the touching points of the object to one another—in other words, conveys at once intelligence both of the magnitude and figure of that object." This is philosophically stated, and is beyond all dispute, and it may, in accordance with these statements, supported by the fact already alluded to, of the evidence of many witnesses, be assumed as certain that any of the systems contended for come quite, and easily, within the touch of the blind in general. We are at liberty, then, to compare the systems in their relative forms. To those who contend for an arbitrary system, I would recommend Braille's, of Paris. The dotted characters are easy to decipher, and the formation of them is simple, and capable of very rapid acquisition; and this great and decided advantage is embraced, that the blind can write it for themselves and read their own writing. One other purely arbitrary system is open, Frere's being by almost common consent abandoned, though at least equal to its stenographic cousin; I allude to that of Mr. Lucas. This system is fostered by an admiring committee, but what in the system commands their admiration I cannot tell. A few questions suggest themselves respecting it:—(A.) This system consists of exceeding few elements, and (B.) it is stenographic. Are these advantages of sufficient weight to win for it universal approval? or are they advantages at all? or are they positive faults? I maintain the latter. The fewness of the elements may be an advantage to the acquiring, but must be a disadvantage to the remembrance, of the system. The Abbé Carton praises, in some slight degree, this system for the very thing for which I think it ought to be condemned. It seems beyond dispute that the simpler the form of each letter in itself the better, but each letter must have a purely distinctive outline. A very simple alphabet might be formed by twenty-six diameters of circles placed at different angles; but who could master it, or rather remember it? There would be so little for the mind to grasp in such an alphabet, that it would again and again elude it altogether. On the other hand, adopt twenty-six totally distinct symbols, and you would have the one, tactile facility being supposed, the most perfect. To take two other alphabets to elucidate this position. The Roman character is as distinct as any can well be, and where it fails it fails through the violation of the principle I have stated. In embossing, with a metal point, backwards for my blind pupils, I have discovered where the few difficulties in mastering the Roman type may lie. The small letters p, q, and g, b and d, always puzzled me, because of their likeness in form, or, in other words, the identity of their elements. Take, also, the Hebrew characters, and examine where the main difficulty is in mastering them. It will be found in those letters that approach each other in form, viz., ה, ח, and ת, כ, and ג, ד and ר. These instances are enough to found a law upon, that facility of discrimination and of retention in memory are in the inverse ratio of the fewness of the elements of a system. The elements of Lucas, I have shown, are three. But what shall we say of the stenographic recommendation? If the blind are to be condemned to numerous complications of contractions and to *barbarous violations of orthography*, I for one, pity their lot exceedingly. A very large page is devoted in the Key to T. M. Lucas's stenographic characters, to an unfolding of the mysteries of this system. Honestly I say it, I am led to admire the patience and power of blind people, who can learn and, we are told, with ease, what sighted people would consider a very hard task indeed. If the blind can learn, as they do, to read Lucas, and that with facility, the argument is for ever and hopelessly cut away from those who object to the Roman type that it has insuperable difficulties. Contrary to an opinion I publicly expressed some time ago, I must say that this seems to me the very worst of tactile systems.

We come, then, to two mixed systems—those of Mr. Moon and the Abbé Carton of Bruges. Let us take Mr. Moon's first. Where Mr. Moon keeps to the outline of the Roman form he does well. The

A is all that is required of the Roman higher case, and the b of the lower. The C is perfect. D would be not a whit less legible if completed, and made like the Roman capital, and it would possess the privilege of being recognised. Why the E should be like large Roman F, and the F like the small Roman f, or the G like Moon's F turned the wrong way, I cannot tell. H in Roman is a good letter for recognition, but Mr. Moon prefers a small o for it. I and J are good because simplified Roman. K would have been no worse for being all there, not a whit less legible, and its old friends would have known it. L is a respectable simplified Roman. M might find apologists, though none to recognise it. N and O are Roman. P, Q, R, S, T, are exceedingly simple, and, therefore, apt to be lost to the memory in their similitude. U, V are opened Roman. W had better never been altered, no much simpler letter can be safely put in its place. X is mere perversity, and so is Y; whilst Z, being Roman, finishes with a good grace. On the whole Mr. Moon has not, certainly, compensated by the increased simplicity of his alphabet for the loss of general recognition. Had he, however, contented himself with simplifying instead of destroying those characters in which he now totally departs from the Roman, retaining the general outline of form, even composing an alphabet, plain, rude, and large, after the fashion of those which in his system are cognisable by the world at large, he would have done a good work for the aged and horny-handed blind. Since no one contends for the Abbé Carton's system in England, I will not say more of it than that it errs exactly in the direction in which, I conceive, Mr. Moon's errs. The "Punktschrift" affords facilities of touch, and the blind are able to emboss this system, as also M. Braille's, but I cannot see the necessity for departing from the Roman form in this. The Belgian blind, however, do correspond with their friends by means of a square Roman lower-case type.

In coming to the Roman, it will have been foreseen that I am wholly in favour of that respectable and universally-used system of blind typography. I have already shown that this system was the first to suggest itself to those who sought to give the blind a literature, and that it holds its own in the world. In America, in Austria, Prussia, the Southern States of Germany, in Italy and Spain, this system is adhered to. Mr. Moon endeavoured to transport his system and plant it in Germany; but, except in a very few cases, he failed. In Berlin a committee took his system under their consideration, and after a patient hearing of the evidence on both sides of the question, came to the decision that they ought to decline Mr. Moon's system and retain that which they had hitherto used, the Roman, issued by the Stuttgardt Society. No investigation could have been conducted with greater impartiality. Those who are interested in the merits of the case would do well to read through the report of this investigation, entitled, "Bericht über Moon's Blindenschrift, von Dr. G. Michaelis," published at Berlin.

Now an examination of the Roman type will convince an impartial judge that there is nothing in the form of the letters themselves to render them difficult to blind readers, if slightly modified. Each letter is a separate and distinct character, with such a combination of elements that, once acquired, the mind will easily retain it. Fry suggested and Alston adopted capitals entirely, and the great majority of German institutions have chosen and kept to those composed of dotted instead of plain lines. . When Mr. Taylor was called upon to decide between the various systems sent to him he selected Fry's as the best; but after a private and most philosophical discussion with the Abbé Carton, who was sent over in the year 1835 by the Belgian Government to visit the English Asylums, these two learned men decided in favour of the higher and lower case, as in ordinary printing. The Abbé pointed out that a word in capitals alone presented to the touch a parallelogram, but that by the introduction of small letters several distinctive marks were introduced that at once suggested the general form of a word, and aided an immediate apprehension of it. But several letters could be, it was agreed, improved by a slight modification. By such modifications, serving, for instance, to distinguish c from e and o, with similar alterations in other cases, all difficulties of the lower-case would be removed. And so it proved, for a triumphant answer is found, to all who urge that the Roman character is useless for blind readers, in the fact that the very small type of Vienna and Dr. Howe's small semi-angular is read without any hindrance, and that by far the greatest amount of blind literature that exists is in Roman character. This completely destroys the sweeping objection that the partisans of Moon's and Lucas's systems so constantly urge. But if we take into account the size of these two systems, it will easily be seen how it is that aged and hard-fingered persons so frequently prefer them to other systems. I have measured with great care the sizes of the various systems, and the result arrived at is, that whereas the Roman systems used, vary from 1-8th of an inch, and under, to 3-16ths of an inch, Moon's and Lucas's measure fully 1-4th of an inch. If, then, we were to print in Roman character 1-4th of an inch in size, we should have books that would be read with as much ease as either of these. I have endeavoured to ascertain the " minimum tactile " in Roman lower-case that a blind person of long education and good touch can apprehend, and have proved before witnesses that down to 1-16th of an inch, *i.e.*, down to the size of common large type in a seeing person's prayer book, letters, well raised, can be deciphered : at 3-32nds, this character can be made out without much difficulty ; at 1-8th, with comfort and ease ; at 3-16ths, with very great readiness. Moon's and Lucas's type, then, let it be remembered, is four times the size of that which it is possible to decipher in Roman, and above the largest capitals used anywhere. If, then, books were printed in Roman higher and lower case from 1-8th to 1-4th of an inch, every possible class of blind reader would be suited. This being so, of course the question of bulk is on our side, or rather is entirely in our own hands. But what of speed? If a reader can go on with comfort and fluency, this is all that is necessary. Blind men have, generally, very few books to read, and much time at their disposal. The question of speed, then, is not of paramount importance. In a report I received from Bristol, the director, Mr. Madday, says respecting speed, that he considers it a question of quite secondary consequence; and M. Bizburck, of Belgium, the successor to the Abbé Carton, in another report, says, "I am of opinion that the Latin proverb comes to the point here, '*Sat cito si sat bene,*' and '*festina lente.*'" But whatever be the merits of different systems, regarding speed one thing is certain, that the qualifying element is more in the reader than the character read, and that no estimate can ever be arrived at of sufficient definiteness to lead to the certain superiority of any one system in this respect over others. If we seek to test the matter, we find such vast differences of talent, that the subjective quite overrule the objective qualities. In proof of this allow me to furnish the following evidence. I sent, lately, to all the English, and to the principal French, German, and American institutions for the blind, a printed form containing the following questions, to elicit statistics which I can find furnished in no English, French, or German works.

1. What system of reading is used in your institution? 2. Are the pupils supplied with any raised book on leaving you? 3. In about what time is the system you use acquired by an average pupil? 4. In how many minutes and seconds can your best reader read the 17th of St. John twice over? The replies so far received entirely set aside any expectation of justly comparing systems in points where subjective qualities are mainly concerned. With respect to the usual time of acquiring a system, I have received the following answers: Lucas—α. Three months, β. Cannot answer the question because of the varying powers of the pupils, γ. Six or eight weeks (in this case a note is added, saying that Lucas is about to be abandoned in favour of Moon, owing to the inconveniences arising from contractions and arbitrary spelling), δ. Cannot say, ε. Three months. Respecting Frere's, two months. Respecting Moon's, α. six weeks, β. eight months, γ. three months, δ. eight weeks or less, ε. three or four years, ζ. twelve months, η. cannot decide, θ. four to six months. Respecting Fry's or Alston's Roman, α. six weeks, β. four or five years, γ. one month, δ. no time given, ε. two or three months, ζ. cannot say. Respecting the Stuttgardt Druckschrift, also Roman capitals, α. six weeks, β. two years, γ. two months, δ. three months, ε. six months, ζ. six months, η. two to four months, θ. four weeks, ι. three months, κ. six to eight weeks, λ. four to five months. If any one can find a rule out of this, he must be ingenious indeed. Assuredly no system can stake its merits upon such a question. The same is true of the speed of deciphering. The rates given vary in each system; for instance, 5′30″ to 23′ in the Stuttgardt; from 7′ to 16′2″ in Alston's Roman; from 5′50″ to 10′ in Lucas's; from 10′ to 26′ in Moon's. On the whole, however, I am disposed to ascribe to Lucas the first place in this, and to Moon the last, as the averages are, for twice reading the chapter named, Moon 16·8, Stuttgardt 13·8, Alston's, or rather Fry's, 12·6′, Lucas, 7·75′. But it must be borne in mind that Howe's

of Boston was read twice through by a pupil of mine in 7·16′, which is below Lucas's average.

However, it will readily be granted that the question of speed of reading and acquisition depends rather upon the reader than the system, and that, after all, it is a question of quite secondary importance beside other questions, and the conclusion, to my mind, is simple. The Roman type is capable of being read with as great facility as any arbitrary system of equal size. It is already in use in by far the greater part of the world. There is a very considerable literature existing in this character. The cheapest raised works out are in Roman. It admits of being taught in any school, or in any home. It precludes the necessity of special teachers, and the vast majority of blind are in isolated localities, far removed from the blessings of teachers and institutions. It inflicts no damage upon common scholarship. It admits every inhabitant of the blind man's home to the knowledge it conveys. In a word, it is a bond of communication and a key of knowledge wherever it is admitted. It cannot be difficult, therefore, to conclude that, *on all grounds taken together*, the Roman type is the one, and the only one eligible, for universal use, although on some particular ground, some other system may have an advantage.

It is on the strength of these considerations that a society has been founded under the presidency of the Lord Bishop of Worcester and the patronage of the Lord Chancellor, Lord Lyttelton, and other distinguished men, to furnish embossed books in the Roman type to the blind, at a price within the reach of the poor.

When this work is accomplished, then the blessings it contemplates will be realized. In the meantime, let us be earnest in our search after truth, rather than the means of victory. At present the blind are the unfortunate bone of a very unseemly contention. Ultimately we may trust to see them the objects of Godlike emulations, and reaping the blessings of real light.

PRINTED BY DEIGHTON AND SON, HIGH STREET, WORCESTER.

# HINTS

FOR

# Blind Home Students,

BY

ROBERT HUGH BLAIR, M.A., F.R.A.S., &c.,

RECTOR OF ST. MARTIN'S, WORCESTER;

EXAMINER AND LATE PRINCIPAL OF THE COLLEGE FOR BLIND SONS
OF GENTLEMEN, WORCESTER.

*A Paper in "The Venture" (a Quarterly Magazine by the Pupils of the College for Blind Sons of Gentlemen, Worcester), of Oct.* 1869.

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WORCESTER: HOLL & DARKE, HERALD OFFICE.
LONDON: THE SOCIETY FOR PROVIDING CHEAP LITERATURE
FOR THE BLIND, 33, ESSEX-STREET, STRAND.

1877.

PRICE ONE HALFPENNY.

# THE VENTURE.

No. III.—October, 1869. Page 89.

## HINTS FOR HOME STUDENTS.

A few words at the opening of this paper respecting the reading of Roman type may be found of use. The only objection that is ever brought forward against this form of type is, that it is too intricate for the finger to decipher. But if the type be fairly spaced, of the same size as that used by Mr. Moon, or Lucas, in their characters, and well opened to the touch, this objection falls to the ground. The form of type adopted at Worcester is of this description. It is so cut that very old and hard-handed men learn to read it without any very great difficulty. At the same time, whilst it is of paramount importance to preserve the common form in type, it is not at all necessary for the blind reader to pass the finger over every part of a letter. A little attention to this reduces the labour of reading immensely. It can easily be shown, that a little observation will reduce a properly-formed Roman type to the greatest simplicity for the touch.

The type that is decidedly the most easy to acquire of the Roman, is what we call the higher and lower case, where capitals and small letters are used as in books for the sighted. Fry's type, which consists entirely of capitals, does not present such decided marks of difference to help on reading as the higher and lower case. Here I may remark that it is not fair to speak of Alston's type, for Alston was but the adopter and patron of that form which Dr. Fry suggested.

In learning to read, then, in higher and lower case, take the alphabet, and, running the finger over the letters, set aside in your mind first all that rise *above* the line in a plain stroke, and make their acquaintance so as to know them at a glance. These will clear out of the way five letters, viz., b, d, h, k, and l. Of these, two are round at the bottom, two terminate in two points, and one is a plain stroke.

Examine these in this manner again and again, and in a page of raised print pick out all the letters of this class till you make no mistake.

Two remain which rise above the line, f and t, but these each have a cross. If, then, you come upon a letter of this kind, you will remember it can be but f or t, and if it be rounded at the top it is f, if at the bottom, t. Now find out in a printed page all the f's and t's, Next, take all the letters that fall *below* the line, which are five, viz., g, j, p, q, and y. Now, how easy are these to decipher! You know that if a letter fall below the line at all, it must be one of these five. If, then, it present below the line a round bulb, you have g, if a straight stroke, either p or q, and the slightest touch of the upper part will tell which; if below the line you feel a crook, you have a j or y, and you can decide which of the two by the dot or the two points above.

There now remain all the letters that do not rise above, or fall below, the line, and in acquiring them you have but to acquire a very easy system of points, for all the endings of curved or straight lines feel to the finger like points. Six letters are round at the bottom, and we will take them first, viz., a, c, e, o, s, and u. We will at once pick out o, it is quite by itself and cannot be mistaken. It has no opening. Next take u, which presents at once two dots at the top. After this examine a and s together. The former is known by the dot and the space to the left, the latter by a dot and space at the top on the right hand, and at the bottom to the left. There remain c and e, which both present to the touch two dots to the right, but the c, as raised, is much more open than the e. In conclusion, i is known at once by the dot—it is needful to feel no more of it; m, by three dots below; w, by three above; n, by two dots below; v, by two above; r, by the arm to the right; x, by four dots, and z, by its spaces.

From what I have said, it will be perfectly easy for the learner of raised type to classify the letters, and to acquire the art of reading without laboriously going over all the intricacies of each. A little careful attention to the capitals will also make known their salient points by which they will be discerned at once.

I presume that by this time my readers have made some progress in the use of the calculating-board described in our July number. If so, there will be no difficulty in proceeding with the examples given in common arithmetics and Algebras. At the same time remarks upon things of interest, that present themselves to one's mind, may be of service to thoughtful students. The first thing that has to be overcome by the arithmetician is notation, or the method of expressing numbers by marks. It is of the utmost consequence to have, at the outset, a sound knowledge of this. It is not enough to be able to put down a few numbers, but the whole reason and method of the thing must be mastered by those who hope to become honest mathematicians. The smallest whole number is of course 1, and this is the measure of all other numbers. If you talk of 6 or 100, you mean so many *ones*. And if you talk of a half, or a sixth, you mean so many parts of *one*. The idea of *one*, then, is expressed by a straight perpendicular line, for the sighted, and for you, on your board, by that position of the peg shewn in the July number of the VENTURE. Now it might have been possible to have a different-shaped figure for each number as far as one liked to go: *e.g.* for 19 or 207 (put these numbers down on the board), instead of having in one case two and in the other three figures, one separate symbol might have been chosen in each case. But then numbers are infinite, and, therefore, such a system must have been always enlarging, and would be a tax upon the memory that it could not be equal to. Another plan, then, has been adopted, which is to have only a small number of figures or symbols to learn, and then to let these stand for different values, by putting them in different positions.

Now in the same way as the choice of these symbols has been quite arbitrary, or, in other words, a matter not of necessity but of convenience, so another step in numbers has been taken for convenience, viz., how many symbols should be chosen, which also decides what has to be the base of the system. I have said that any number means so many *ones*. That is the same as to say that 1 is the base of all numbers. But the way in which numbers are to be *put together* is the system of numbers, for the word system means the *standing together*. As numbers have one for their base, so systems have *a base* also. But there is this difference—the base of all numbers is necessarily 1: but the base of a system may be any number whatever. The number which has been chosen for the base of our system, then, is ten, and we proceed to act with it thus. Just for the sake of convenience put down a cipher, so as to form a starting point. Whatever number you put down in the first place to the left of it, means so many ones: *e.g.*, if you put down 7, it means 7 times 1. The highest value that can stand in this first place is 9. For all values between 9 and 100 you must use the first *two* places. Thus the number that is put in the second place to the left means so many times 10, to which you add the unit, or the figure in the first place. Let there be, we will say, 3 in the second place, and 5 in the first. This means 3 times 10, and 5, or 35. In the third place to the left, any number means so many times $10 \times 10$ or 100, or $10^2$ (read 10 to the second power), to which is added the value of the first two. Put down 435. This means $4 \times 10^2$, and 35. In the fourth place to the left, any number means so many times $10 \times 10 \times 10$ or 1000, or $10^3$ (read 10 to the third power), to which must be added all that precedes to the right. Put down 7435. This means, $7 \times 10^3$ and 435. Or if it be put down fully with the signs between $7 \times 10^3 + 4 \times 10^2 + 3 \times 10^1 + 5$. You see, therefore, that the movement of a figure one place farther to the left increases its value by a power of 10. A seven in the first place means $7 \times 1$, or as mathematicians call it, $7 \times 10^0$; in the second place, $7 \times 10^1$; in the third, $7 \times 10^2$; in the fourth, $7 \times 10^3$; in the fifth, $7 \times 10^4$, &c., &c. If there be no other wanted in the remaining places to the right of any figure, ciphers are put in to show in what place the figure stands. Ten, then, is called the *base* of this system of notation, which in other words is called the decimal system. As an exercise in the meaning of any number, analyze the following:—27, 209, 1345, 97836, 765987.

In doing so, you can refer to the instructions for the board, p. 44, in the July number, and in putting down the power of *ten*, put a one, two, or three, or, as the case may be, just over the 0 to the right hand.

I have spoken of the *power* of a number. A clear notion of a *power* is most necessary. If we speak of 2 simply, or of 3 simply, we have 2 or 3 in their first power. But if we take $2 \times 2$ or $3 \times 3$, we have 2 or 3 in their second power. If $2 \times 2 \times 2$, or $3 \times 3 \times 3$, we have 2 or 3 in their third power, and so in all cases. Thus $2^2 = 2 \times 2 = 4$. $3^3 = 3 \times 3 \times 3 = 27$. It will be useful to learn by heart the powers of each of the units in turn up to the third or fourth. The small figure over, that shows the power, is called the *index*.

It will be as well in learning notation to practice putting down numbers at once both in integers and decimal fractions, for this will increase the interest much. I have shewn that, putting down a cipher as a starting point, by moving on to the left you increase by a power of 10 for each move. Now by proceeding from the starting point to the right, for each move you diminish by a power of 10. If you place a 2 in the first place to the right of the point, which we call the decimal point, it does not mean 2 times one, but a tenth part of 2. If in the second place to the right, the space being filled up with a cipher, it means 2 divided by the second power of 10, or 100, and so forth. This whole system should be taken in at once, and it will be a wonderful help ever after in the understanding of numbers. In accordance with this, such a quantity as 34798·361 would mean $3 \times 10^4 + 4 \times 10^3 + 7 \times 10^2 + 9 \times 10^1 + 8 \times 10^0 + 3 \times 10^{-1} + 6 \times 10^{-2} + 1 \times 10^{-3}$. In this notation it is plain how 10 is the base. But this is not of necessity, but convenience. Also two things occur which I have not explained, viz., the meaning of $10^0$ and $10^{-1}$, &c. These points shall be taken up next number. In the mean time, those students who are so young as not to be prepared for all that has been here written may carefully exercise in the simple putting down of numbers in right order. But all who are more advanced should make up their minds to master the whole method and reason of it, and should analyze and illustrate on the board for the sake of becoming familiar with both theory and practice.

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WORCESTER:
PRINTED AT THE HERALD OFFICE, 72, HIGH-STREET.

REPRINT, 1889.

Exhibition of the Works of Industry of all Nations, 1851.

# THE BLIND.

EXTRACTS

FROM

THE REPORTS OF THE JURIES.

## WRITING AND READING APPARATUS AND BOOKS FOR THE BLIND.

LONDON:
Printed for the Royal Commission,
BY
WILLIAM CLOWES & SONS, STAMFORD STREET AND CHARING CROSS.
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# WRITING AND READING APPARATUS AND BOOKS FOR THE BLIND.

### INSTRUMENTS FOR THE USE OF THE BLIND.*

HUGHES (No. 401, p. 452) has exhibited a portable typograph or writing machine for the blind.

This is a beautiful mechanical contrivance (by no means difficult in use) by which a blind person is enabled to print legibly, with ease and rapidity. It is also applicable to printing uniform labels for museums, &c. (for description see 'Illustrated Catalogue'). The following is the manner of using it. The paper intended to be written upon is placed within a portfolio, one side of which is made of semi-carbonised paper, which, being durable and inexpensive, serves for ink. Having done this with the first finger of the right hand, any required letter, figure, or point of the index circle is brought to the right side of the lever, the thumb being inserted in the end of which, presses it downwards. This pressure will give the impression of a corresponding type letter acting upon the back of the transfer paper. The next operation is to lift the lever to its utmost height, which motion makes the space required for the next letter, and so on to the end of a word. A repetition of the movement will also make the space between the words.

Having finished a line of writing, the index circle is pushed back to the left side of its frame, and the thumb-screw turned for the desired distance between the lines; one whole turn of this screw giving four lines to the inch.

The typograph is about the size of a quarto book, and does not occupy a surface of more than 12 inches square. Its inventor has done good service, having the merit of exhibiting the best machine for the same purpose, it being the most simple in its operations of any in the Exhibition. The prize medal was awarded to Mr. Hughes.

TOLLPUTT (No. 382, p. 451) exhibits a machine for facilitating the writing of the blind.

FOUCAULT (France, No. 220A, p. 1187) has exhibited a printing machine for the blind. It consists of a fan composed of 26 rods, terminated at the upper extremity with the letters of the alphabet arranged successively, together with other rods terminated with the various ciphers and symbols required in printing; the lower extremity of these rods is furnished with a corresponding letter, &c., to the one above, but in smaller type. On pressing the larger character at the upper extremity, the smaller letter beneath is proportionably depressed, which causes it to leave its printed impression on a paper previously prepared. By a little contrivance the paper is made to move onwards, in proportion to the successive pressures from above. The exhibitor of this machine, himself blind, has the merit of being its inventor, and he was awarded the prize medal.

THOMPSON (United States, No. 26, p. 1434) has exhibited an invention for teaching the blind to draw and write. This device is simple, and intended to afford a means to the blind of acquiring knowledge of various kinds.

The writing tablet is covered with white leather, a material well suited to the purpose intended, as it yields to the pressure of the style without retaining the impression.

The style may be made of any hard material capable of receiving and retaining a rounded smooth point. The paper should be of a strong and rather firm texture, but at no visit of the Jury was any explanation given, and they are unable to speak further of this invention.

GALL (No. 687A, p. 471) has exhibited a triangular alphabet for the blind. This is an improvement on the Parisian, Austrian, and other circular alphabets, and it is probable that adult blind persons may by its means be easily taught to read. A volume containing the Epistle to the Ephesians, in the same characters, was exhibited, and Gall's apparatus for the writing of the blind, by means of which they can correspond with each other by post, as described in the 'Illustrated Catalogue.'

MARCHESI (Austria, No. 139. p. 1049) exhibits a circular printing machine, by which the blind can print readily with three different kinds of type. On examination by the Jury it elicited much commendation, and a prize medal was awarded to M. Marchesi.

### PRINTING FOR THE BLIND.*

The Jury have noticed with pleasure the large number of exhibitors, from England, France, the Zollverein, and the United States, of inventions and devices for the instruction of the blind. It has been estimated that in the European countries one person out of every 1200 or 1400 of the entire population is blind, and in America one in every 2000. The great and increasing attention that is paid to the intellectual and moral instruction of this unfortunate class, is one of the distinctive features of the progress of our age. A few years ago, printing for the blind was considered only a curious or doubtful experiment, but it is now established beyond all question that books are true sources of profit and pleasure to them. Whilst embossed books have recently very rapidly increased, it is delightful to notice that the blind readers have multiplied far more rapidly. These circumstances have induced the Jury to attempt a brief historical sketch of the origin and progress of printing for the blind, together with the present state of the art.

The invention of printing for the blind marks a new era in the history of literature. The whole credit of this invention, so simple, yet so marvellous in its results, belongs to France. It was M. Valentine Haüy, who, in 1784, at Paris, produced the first book printed with letters in relief, and soon after proved to the world that children might easily be taught to read with their fingers. It has been said by his biographer, that he took his idea of embossed typography from seeing that Mademoiselle Paradis, a blind pianist of Vienna, who visited Paris that year, distinguished the keys of her instrument by the sense of touch, and also readily comprehended the maps in relief, which a short time before had been invented by M. Weisembourg of Mannheim. After employing letters of different forms and sizes, and experimenting with the blind as to the precise shape of the letter that could be the most readily distinguished by the touch, he at length fixed upon a character differing very slightly from the ordinary Roman letter, or perhaps a little approaching *italics*. There was the usual mixture of the upper and lower case, the capitals taking more of the *script* form than the small letters. He submitted his first efforts and experiments to the Academy of Sciences of Paris. A committee was appointed to examine them, consisting of the Duc de la Rochefoucauld, M. Desmarets, M. Demours, and M. Vicq-d'Azir, and their favourable report on the 18th of February, 1785, rendered his success a triumph. Great

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* 'Reports of the Juries,' p. 311.

* 'Reports of the Juries,' pp. 413–423.

*éclat* attended the public announcement of this invention. A new Institution was established, called the Institution Royale des Jeunes Aveugles, and M. Haüy was placed at the head of it. Among the books which he embossed were a grammar, a catechism, and small portions of the Church Service, and also several pieces of music. The printing of the music was inferior. The abbreviations which he introduced into his grammar, it has been said, did not afford sufficient advantages to counterbalance their inconvenience. His principal work is entitled 'Exposé de différends moyens vérifiés par l'expérience pour les mettre en état de lire à l'aide du tact, d'imprimer des livres dans lesquels ils puissent prendre des connaissances de langues, d'histoire, de géographie, de musique, etc.; d'exécuter différends travaux relatifs aux métiers. Imprimé par les Enfants Aveugles.' Paris, 1786, 4to. This celebrated essay was translated into English by Dr. Blacklock, the blind poet, and in 1793 was published in London with his poems, in quarto. On the 26th of December, 1786, twenty-four of M. Haüy's pupils exhibited their attainments in reading, writing, arithmetic, music, and geography, before the King and the royal family, at Versailles, who were delighted with the wonderful results. For a while all went on prosperously, but M. Haüy's friends soon began to give him credit for zeal, rather than discretion in the management of his Institution, and consequently as the novelty wore away, their admiration cooled, the funds fell off, and the Institution languished until it was put upon a Government foundation. The blind really received but little advantage from an invention that at first promised so much. The fault, however, seems to have been not so much in the plan as in the execution of it. The books were bulky and expensive, and the letters, though beautiful to the eye, and clearly embossed, wanted that sharpness and permanence so essential to perfect tangibility; besides that, though the letters filled three spaces, they were too small to be well adapted to the sense of touch. Large editions of the few books printed were published, the idea having taken a strong hold of the public mind, so that though the evil was soon perceived, it was not easy to abandon the defective alphabet and assume a better, for that step involved the sacrifice of all the previous labour. Hence this noble invention, except, perhaps within the walls of the Institution, soon sank into oblivion, and very little more was heard of it until 1814, when Haüy, having fallen into disrepute, was pensioned off on 2000 francs a year, and Dr. Guillié, an active and enterprising gentleman, was made "Directeur-Général" in his place. Dr. Guillié soon revived the printing, and having considerably modified the letters, commenced the publication of a series of elementary and other works. [For list see Table I., p. 4 of this pamphlet.]

The mechanical execution of these volumes was exceedingly heavy. Most of them were ponderous folios, and very expensive, still they formed for many years almost the only literature of the blind, not alone in France, but in other countries. We should not omit particularly to mention the following book which has come under our notice:—'Notice Historique sur l'Instruction des Jeunes Aveugles. Par M. Guillié, Directeur-Général de l'Institution Royale des Jeunes Aveugles de Paris. Paris, imprimé par les Jeunes Aveugles,' 1819, 4to, 52 pages, with 17 lines to a page. Two leaves are pasted together, so that it is read as if embossed on both sides of a sheet. This is the second edition, the first having been embossed in 1817, the third in 1820, and a fourth edition enlarged in 1821. On page 52 is a curious specimen of printing in relief, in colour, so as to render the letters more easily read by the eye. This book was a valuable contribution to the library of the blind, but still retains nearly all the objections that were made to Haüy's first books; it can only be read by those possessing a very delicate touch. It is replete with information respecting the means then employed for the instruction of the blind in Paris; it proves, however, that the art of embossed typography had made but very little progress. It is singular that in this book no mention is made of the author's predecessor, Haüy, to whom, we should not forget, the idea of finger-reading is due.

Between the years 1821 and 1840, very little printing was done by this Institution, except religious books, and music after the system of notation by letters and ciphers. [For list see Table II., p. 4 of this pamphlet.]

'L'Institut des Jeunes Aveugles de Paris,' since its foundation in 1784, has at times been in a deplorable condition, but about the year 1840, it underwent a thorough reorganisation, and is now, under the able management of M. Dufau, justly entitled to the front rank of institutions of this class in Europe, from its usefulness no less than its age. A radical reform in the printing department has been made; M. Dufau has devised a system of types consisting of capitals and lower-case Roman letters, and has greatly improved the character of the embossing. The French books are now well embossed, sharp, clear, and durable. They have also been so much reduced in bulk, that they are offered at a moderate price. M. Dufau has proposed to print a 'standard library' for the blind, to consist of 10 vols. in quarto, for elementary instruction, and 10 vols. for higher instruction. The first series is nearly completed. [For list see Table III., p. 4 of this pamphlet.]

The second series of this library, not yet printed, it is to be hoped will soon follow. For the above lists, and other interesting information respecting the Paris typography for the blind, the Jury is much indebted to a valuable pamphlet published by M. J. Guadet, entitled 'L'Institut des Jeunes Aveugles de Paris, son Histoire et ses Procédés d'Enseignement,' Paris, 1850, 8vo, pp. 115.

At Vienna an institution for the blind was established in 1804, but the Jury is not aware of any printing having been executed in Austria before the year 1830 or 1831. About this date the intelligent publishers Treusinsky, of Vienna, embossed sheets with the Lord's Prayer in various languages, in Roman letters, and afterwards printed works for elementary instruction. The subject has been recently taken up by the Imperial Printing-office, and several volumes have been published, but the Jury are unable to give a bibliographical description of them.

In 1806, M. Haüy was invited to establish institutions for the blind at Berlin and St. Petersburg. His system of instruction was adopted in each of these institutions, and the books used were for a considerable time supplied from the press of Paris. Both of these institutions in a pecuniary point of view were unsuccessful to M. Haüy, and in 1808 he returned to Paris, and for a while resided in quiet with his brother, the celebrated Abbé Haüy.

The Jury have not been able to trace the progress of the printing for the blind at Berlin or St. Petersburg, but they learn that the amount of matter embossed in Germany until very recently did not exceed half of the New Testament.

It was in Great Britain and in the United States that the first improvements were made in embossed typography; and only within the last fifteen years that the blind generally have derived any considerable advantages from books. Before 1826, when Mr. James Gall, of Edinburgh, first began to turn his attention to the intellectual and moral education of the blind, it is believed that not a single blind person in any public institution of this country or America could read by means of embossed characters. To Mr. Gall is due the credit of reviving this art. With the most commendable zeal, patience, and perseverance, he canvassed the form of every letter, until at length he adopted his angular alphabet. He seems, from his own 'Historical Sketch of the Origin and Progress of the Literature of the Blind,' Edinburgh, 1834, 8vo, pp. 388, to have experimented long and patiently with a great variety of arbitrary and Roman alphabets, with a view of finding one sufficiently simple and tangible for finger-reading. On the 28th of September, 1827, he published 'A First Book for teaching the Art of Reading to the Blind; with a short statement of the principles of the art of printing as here applied to the sense of touch. Edinburgh, published by James Gall.'

TABLE I.

| Title. | Number of Vols. | Size. | Date of Publication. | Number of Pages. | Number of Square Centimetres in a Page. | Price. |
|---|---|---|---|---|---|---|
| | | | | | | francs. |
| Une Grammaire Anglaise | 1 | folio | 1817 | .. | 840 | Published at 50 francs a volume, but since sold for waste paper. |
| Morceaux extraits d'Auteurs Anglais | 1 | " | 1818 | 96 | " | |
| Une Grammaire Latine abrégée de celle de Lhomond | 2 | " | 1818 | 171 | " | |
| Une Grammaire Italienne | 2 | " | 1818 | 240 | " | |
| Morceaux extraits d'Auteurs Italiens | 1 | " | 1819 | .. | " | |
| Une Grammaire Grecque | 2 | " | 1819 | 244 | " | |
| Extraits d'Auteurs Grecs | 1 | " | 1819 | 120 | " | |
| Une Grammaire Espagnole | 2 | " | 1819 | 237 | " | |
| Une Géographie | 2 | " | 1819 | 220 | " | |
| Les Choix de Lectures pieuses | 1 | " | 1819 | 120 | " | |
| Les Elements de Lecture | 1 | " | 1820 | 88 | " | |
| Un Catéchisme | 1 | " | 1820 | 79 | " | |
| Choix de Morceaux empruntés aux Prosateurs Latins | 2 | " | 1820 | 240 | " | |
| Extraits des Poëtes, Phèdre, Horace et Virgile | 1 | " | 1820 | 100 | " | |
| Les Offices du Matin et du Soir | 2 | 4to | 1820 | 232 | " | |

TABLE II.

| Title. | Number of Vols. | Size. | Date of Publication. | Number of Pages. | Number of Square Centimetres in a Page. | Price. |
|---|---|---|---|---|---|---|
| Epîtres et Evangiles des Dimanches et Fêtes | 2 | folio | 1823–8 | .. | .. | .. |
| Prières du Matin et du Soir | 1 | 4to | 1825 | .. | .. | .. |
| Annuaire de l'Organiste, par G. Gauthier | 2 | folio | 1828 | .. | .. | .. |
| Office Noté des Jeudi, Vendredi, et Samedi Saints | 1 | 4to | 1829 | .. | .. | .. |
| Procédés pour écrire au Moyen des Points, par L. Braille | 1 | " | 1829 & 1837 | .. | .. | .. |
| Manière de mélanger les Jeux de l'Orgue, par Marius Gruêt | 1 | " | 1830 | .. | .. | .. |
| Traité de la Fugue, par Fétis | 1 | " | 1830 | .. | .. | .. |
| Office Noté | 1 | " | 1830 | .. | .. | .. |
| Eléments d'Arithmétique extraits de Reynaud | 3 | folio | 1830 et suiv. | .. | .. | .. |
| Nouvelle Méthode pour représenter la Musique au moyen de Lettres, de Chiffres, &c., par M. Moulin | 1 | 4to | 1831 | .. | .. | .. |
| Traité d'Harmonie, par Catel | 1 | folio | 1833 | .. | .. | .. |
| Figures de la Géométrie et de la Trigonométrie de Legendre | 1 | 4to | 1833 | .. | .. | .. |
| Figures de la Statistique de Poinsot | 1 | " | 1833 | .. | .. | .. |
| Choix d'Anecdotes (Système d'écriture en Points) | 1 | " | 1834 | .. | .. | .. |
| Grammaire Française de Noël et Chapsal | 1 | folio | 1834 | .. | .. | .. |
| Méthode de Lecture | 1 | " | 1836 | .. | .. | .. |
| Doctrine Chrétienne de Lhomond | 5 | " | 1837 et suiv. | .. | .. | .. |
| Histoire Sainte | 1 | " | 1838 | .. | .. | .. |
| Principes élémentaires d'Harmonie à deux parties, par Gautier | 1 | 4to | 1838 | .. | .. | .. |
| Petit Mémento d'Arithmétique, par L. Braille | 1 | " | 1838 | .. | .. | .. |
| Recueil de Cantiques pour Trois Voix, par Gautier | 3 | " | 1838 | .. | .. | .. |
| Cours pour apprendre à accorder les Pianos, par Moulin | 1 | folio | 1839 | .. | .. | .. |
| Principes de Musique, par Collat | 1 | " | 1839 | .. | .. | .. |
| Principes d'Harmonie à plus de deux parties, par G. Gautier | 1 | " | 1839 | .. | .. | .. |
| Etudes pour Piano, par Cramer | 1 | 4to | 1839 | .. | .. | .. |
| Examen de Conscience | 1 | " | 1840 | .. | .. | .. |

TABLE III.

| Title. | Number of Vols. | Size. | Date of Publication. | Number of Pages. | Number of Square Centimetres in a Page. | Price. |
|---|---|---|---|---|---|---|
| | | | | | | francs. |
| 1. Grammaire Française, par MM. Noël et Chapsal, simplifiée à notre usage | 1 | 4to | 1846 | 144 | 476 | 5 |
| 2. Complément du Cours de Grammaire | 1 | " | Not out | .. | 476 | 5 |
| 3. Traité d'Arithmétique Elémentaire, par M. Dufour | 1 | " | 1845 | 146 | 476 | 5 |
| 4. Géographie élémentaire, par M. Poulain de Bossay | 1 | " | .. | 114 | 476 | 5 |
| 5. Histoire Sainte* | 1 | " | Not out | .. | 476 | 5 |
| 6. Histoire Ancienne* | 1 | " | 1847 | 159 | 476 | 5 |
| 7. Histoire Romaine* | 1 | " | Not out | .. | 476 | 5 |
| 8. Histoire de France* | 1 | " | 1845 | 146 | 476 | 5 |
| 9. Histoire Naturelle, extraite de divers Auteurs | 1 | " | 1847 | 108 | 476 | 5 |
| 10. Géométrie élémentaire | 1 | " | Not out | .. | 476 | 5 |

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* These four histories were composed by M. Guadet upon a new plan, and are peculiarly adapted to the use of beginners.

This is believed to be the first book printed for the blind in the English language. It is a small oblong octavo volume, of nine pages, price sixpence, with four preliminary leaves in which the author sets forth his "principles." The embossing is in high relief, and though it presents rather a rude appearance from the fact of its having been printed from wooden types, yet it soon rendered the practicability of reading by the blind a matter of experience in Great Britain. Mr. Gall then issued sheets printed by metallic type, which were easily read by the pupils in the asylum at Edinburgh. Encouraged by his success, in March 1828 he issued his prospectus for the publication, by subscription, of the 'Gospel by St. John,' but it was not until about the middle of 1829 that he perfected his alphabet to his own satisfaction. He tried three different founts of type:—first, the *double english* size; second, the *double pica*; and third, the *great primer*; and, after printing and cancelling sheets in each of these three founts, he at length, in January 1832, finished the printing of his great work. The blind must ever feel indebted to Mr. Gall for the zeal and honest endeavour which he displayed in accomplishing what he thought would most benefit this unfortunate class. Notwithstanding the last sheet of his work was printed in January, 1832, yet it was not till October, 1834, that he was enabled to publish it. It is entitled, 'The Gospel by St. John, for the Blind: with an Introduction, containing some Historical Notices regarding the Origin of a tangible Literature for their Use. By James Gall. Edinburgh: James Gall, 24, Niddry Street. 1834. In 4to.' The Introduction, in common type, comprises 18 pages. The text, in embossed characters, consists of 141 pages, with 27 lines on a page of 70 square inches. The leaves are not pasted together. The subscription price of the volume was one guinea, but it was subsequently sold for 6*s*. Gall was very sanguine of the entire success of his noble enterprise, and, probably, had he chosen a less angular character, and one a little more resembling our common alphabet, as he has since done, he would soon have seen his books used in every institution in the country. His alphabet was the chief objection raised to his system. His printing was clear, sharp, and permanent, and his books in every respect were a great improvement on Haüy's and Guillié's. He published five or six other little elementary books in 1834, at the time he issued his chief work; but his system seems not to have come into extensive use. It is to Mr. Gall, perhaps, more than to any other man, that the interest in the education of the blind was awakened throughout Great Britain and America. Nor has he allowed his exertions to flag. In 1837, he published 'The Epistle of Paul the Apostle to the Ephesians, printed for the Blind, on the largest type.' The shape of the characters is similar to that upon which the Gospel of St. John was printed, but instead of being smooth the letters are fretted or serrated. It is a small octavo volume of 72 pages, 17 lines to a pages; 250 copies were printed at the price of 1*s*. 6*d*. It is printed in the lower-case letters without capitals. The Epistle to the Philippians was also printed, in octavo, price 1*s*. 6*d*. The following year he again modified and improved his alphabet by bringing it back to a still greater resemblance to the common alphabet, but unfortunately he yielded to the suggestion of the Society of Arts of Edinburgh by introducing the use of capital letters at the beginning of sentences and proper names. His next book was 'The Gospel according to St. Luke, printed on the common alphabet, for the use of the Blind, and capable of being read by any blind person, 1838. Printed for the British and Foreign Bible Society, London. Printed by James Gall, 22, Niddry Street, Edinburgh.' This is a well-printed volume of 158 pages, 28 lines on a page of 70 square inches; price 5*s*. The same year the Acts of the Apostles were printed in the same serrated letter in 150 pages, price 5*s*. Besides these books Mr. Gall printed a series of tracts for the blind for the London Tract Society, in 1837, price 6*d*. each. It is a matter of surprise that these excellent and well-printed books of Mr. Gall are not more generally used. With the exception of the school at Abbey Hill, near Edinburgh, it is believed they are adopted by no public Institution in Great Britain. It is still a question if the roughness of the serrated character possesses any advantage over the smooth, sharp embossing. Old and used books are frequently preferred by the blind to new and fresh ones.

While Mr. Gall was thus engaged at Edinburgh, the Rev. Mr. Taylor, of York, displayed an intelligent and active interest in the education of the blind. In 1828, he published the 'Diagrams of Euclid's Elements of Geometry in embossed or tangible form,' in 8vo. This was done on Bristol board, but was found too expensive. His mode of embossing, we believe, was forcing the paper, by means of heavy pressure, into the deep cut lines of a copper plate. It was not successful. He published also a map of England and Wales. In 1836, he printed in raised characters 'Selections of Psalm Tunes and Chants' in oblong 4to. Also a short history of Elijah the Prophet, and of Naaman the Syrian; and the History of Joseph.

The efforts of Mr. Alexander Hay, in the cause of embossed typography, deserve mention, although an entire failure. He devised an alphabet of 26 arbitrary characters, which by certain combinations could represent the abbreviations and double letters; so that in all, he had 58 characters. He procured types and other printing apparatus, and in 1828 or 1829, issued a prospectus for publishing the Gospel of St. Matthew, at 7*s*. 6*d*. The book was never published.

The public interest in the blind became so great, that in 1832 the Society of Arts of Edinburgh offered a gold medal, of the value of 20*l*., "for the best communication on a method of printing for the blind," and the result was that between the 9th of January, 1832, and the 25th of February, 1835, no less than nineteen different alphabets were submitted, of which sixteen were in a purely arbitrary character. The grand problem was to produce an alphabet that would unite cheapness and legibility.

While the puzzling question of an alphabet best adapted both to the fingers of the blind and the eyes of their friends, was under warm discussion on this side the Atlantic, Dr. Howe was developing his system at Boston, in the United States. In 1833, the Perkins Institute for the Blind was established at Boston, and Dr. S. G. Howe, a gentleman distinguished through a long series of years for his philanthropic labours, was placed at its head. As Gall had done, Dr. Howe took Haüy's invention as the basis of his system, and soon made those improvements and modifications which have rendered the Boston press so famous. He adopted the common Roman letter of the lower case. His first aim was to compress the letter into a comparatively compact and cheap form. This he accomplished by cutting off all the flourishes and points about the letters, and reducing them to the minimum size and elevation which could be distinguished by the generality of the blind. He so managed the letters that they occupied but a little more than one space and a half instead of three. A few of the circular letters were modified into angular shapes, yet preserving the original forms sufficiently to be easily read by all. So great was this reduction, that the entire New Testament, which, according to Haüy's type, would have filled nine volumes, and cost 20*l*., could be printed in two volumes for 16*s*. Early in the summer of 1834 he published the Acts of the Apostles. Indeed, such rapid progress did he make in his enterprise, that by the end of 1835 he printed in relief, the whole of the New Testament for the first time in any language, in four handsome small quarto volumes, comprising 624 pages, for four dollars. These were published altogether in 1836. The alphabet thus contrived by Dr. Howe in 1833, it appears, has never since been changed. It was immediately adopted, and subsequently became extensively and almost exclusively used by the seven principal public institutions throughout the country. It is now the only system taught or tolerated in the United States, and deserves only to be better known in Great Britain and elsewhere to be appreciated. In America, seventeen of the States have made provision for the education of their blind, and as universal education is the policy of the country as well as its proudest boast, these books for the blind soon became in great demand. Dr. Howe some time since proposed a library for the blind, and with a view of increasing the number of books as rapidly as possible, arrangements have been made between the several institutions and presses to exchange books with each other, and not to print any work already belonging to the library of the blind. This harmony of action, together with the uniformity of the typography, presents so many obvious advantages, that the Jury cannot but wish a similar system were pursued by the Institutions of Great Britain and the continent of Europe. We subjoin a list of the books printed at the press of the Perkins Institution in Boston [Table IV.].

From this list it appears that, exclusive of the three volumes not fully described, 7903 pages, containing on an average 77 square inches, have been printed at this press, or more than twelve times the quantity of matter contained in the New Testament. Almost all the books are stereotyped, and small editions are struck off as they are required. They are sold at the actual cost, the cost of the larger works being averaged on an edition of 250 copies. The above prices include the binding; 50 per cent. discount is made for books sold in sheets. The books are embossed in the Institution under the superintendence of Dr. Howe himself, by means of a powerful press, built for the purpose. The sale of books in 1851 amounted to 427 dollars. This, however, is exclusive of the Scriptures. The American Bible Society, which now uses the stereotype plates of the Bible described above, distributed last year 149 volumes of the Bible. In short, the Boston books possess a neatness, clearness, sharpness, and durability of impression peculiar to themselves. The seventh volume of the Cyclopædia is already printed, and the Jury learn with pleasure that the printing of the remaining volumes will be resumed and probably be finished in twenty volumes very soon. Want of funds is the temporary and only obstacle.

TABLE IV.

| Titles. | Number of Vols. | Size. | Date of Publication. | Number of Pages. | Number of Square Inches in a Page. | Prices. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | dolls. | £ | s. | d. |
| The Bible, containing the Old Testament | 6 | 4to | 1842 | 1849 | 117 | 16·00 | 3 | 6 | 1 |
| The New Testament (small) | 4 | „ | 1836 | 624 | 84 | 4·00 | 0 | 16 | 6 |
| The New Testament (large) | 2 | „ | 1842 | 430 | 117 | 4·00 | 0 | 16 | 6 |
| (The several books sold separately at corresponding prices.) | | | | | | | | | |
| The Acts of the Apostles | 1 | „ | 1834 | .. | 84 | .. | .. | | |
| Lardner's Universal History | 3 | „ | 1837 | 437 | 88 | 9·00 | 1 | 17 | 2 |
| Howe's Geography | 1 | „ | 1836 | 174 | 88 | 3·00 | 0 | 12 | 6 |
| Howe's General Atlas | 1 | folio | .. | .. | .. | 3·00 | 0 | 12 | 6 |
| Howe's Atlas of the United States | 1 | „ | .. | .. | .. | 2·00 | 0 | 8 | 4 |
| Howe's Atlas of the Islands | 1 | 4to | 1838 | 44 | 80 | 2·50 | 0 | 10 | 4 |
| English Reader, First Part | 1 | „ | 1838 | 146 | 75 | 3·00 | 0 | 12 | 6 |
| English Reader, Second Part | 1 | „ | 1839 | 139 | 75 | 3·00 | 0 | 12 | 6 |
| Dairyman's Daughter | 1 | „ | 1835 | 162 | 50 | 1·00 | 0 | 4 | 2 |
| The Harvey Boys | 1 | „ | 1837 | 77 | 85 | 1·00 | 0 | 4 | 2 |
| The Spelling-book | 1 | „ | 1835 | 80 | 51 | 1·00 | 0 | 4 | 2 |
| Bunyan's Pilgrim's Progress | 1 | „ | 1836 | 184 | 84 | 2·50 | 0 | 10 | 4 |
| Baxter's Call | 1 | „ | 1836 | 139 | 76 | 1·50 | 0 | 6 | 3 |
| Murray's English Grammar | 1 | „ | 1835 | 112 | 51 | 1·00 | 0 | 4 | 2 |
| Howe's Blind Child's First Book | 1 | „ | .. | 32 | 30 | 1·00 | 0 | 4 | 2 |
| Howe's Blind Child's Second Book | 1 | „ | 1846 | 45 | 30 | ·75 | 0 | 3 | 1 |
| Sixpenny Glass of Wine | 1 | „ | .. | 26 | 41 | ·50 | 0 | 2 | 1 |
| Life of Melancthon | 1 | „ | 1837 | 50 | 32 | 1·00 | 0 | 4 | 2 |
| Book of Sacred Hymns | 1 | „ | .. | .. | .. | 1·00 | 0 | 4 | 2 |
| Howe's Blind Child's Manual | 1 | „ | 1840 | 65 | 35 | ·75 | 0 | 3 | 1 |
| Constitution of the United States | 1 | „ | .. | 25 | 75 | ·75 | 0 | 3 | 1 |
| Book of Diagrams | 1 | „ | 1836 | 58 | 48 | ·75 | 0 | 3 | 1 |
| Viri Romæ | 1 | „ | 1839 | 52 | 75 | 2·00 | 0 | 8 | 4 |
| Peirce's Geometry, with Diagrams | 1 | „ | 1840 | 85 | 75 | 2·00 | 0 | 8 | 4 |
| Political Class Book | 1 | „ | 1841 | 112 | 75 | 2·00 | 0 | 8 | 4 |
| First Tables of Logarithms | 1 | „ | 1841 | 75 | 88 | 1·00 | 0 | 4 | 2 |
| Second Tables of Logarithms | 1 | „ | 1841 | 133 | 80 | 2·00 | 0 | 8 | 4 |
| Principles of Arithmetic | 1 | „ | 1840 | 49 | 75 | 1·00 | 0 | 4 | 2 |
| Astronomical Dictionary | 1 | „ | 1841 | 49 | 63 | 1·50 | 0 | 6 | 3 |
| Smellie's Philosophy of Natural History | 1 | „ | 1845 | 189 | 75 | 3·00 | 0 | 12 | 6 |
| Olmsted's Rudiments of Natural Philosophy | 1 | „ | 1845 | 122 | 80 | 3·00 | 0 | 12 | 6 |
| Cyclopædia | 6 | „ | 1845–9 | 1,388 | 114 | 18·00 | 3 | 14 | 4 |
| The Book of Common Prayer | 1 | „ | 1845 | 240 | 114 | 1·00 | 0 | 4 | 2 |
| Guide to Devotion | 1 | „ | 1846 | 141 | 114 | 1·00 | 0 | 4 | 2 |
| Book of Psalms | 1 | „ | 1837 | 146 | 88 | 1·00 | 0 | 4 | 2 |
| Book of Proverbs | 1 | „ | 1842 | 38 | 117 | ·50 | 0 | 2 | 1 |
| Psalms in Verse | 1 | „ | 1835 | 97 | 73 | 1·00 | 0 | 4 | 2 |
| Psalms and Hymns | 1 | „ | 1848 | 189 | 120 | 2·00 | 0 | 8 | 4 |

About the time that the Perkins Institution was established at Boston, another was set up in Philadelphia. A meeting of benevolent persons was called on the 21st of January, 1833, when arrangements were made to open a school for the instruction of the blind, and Mr. J. R. Friedlander was placed at its head. This school became the Philadelphia Institution for the Blind by Act of Incorporation, 27th January, 1834. The blind owe much to Mr. Friedlander for the Philadelphia contributions to their literature. On the 21st of November, 1833, he held his first public examination, and astonished the public by the progress of his pupils in reading, writing, geography, music, &c. The pupils read fluently from tangible letters executed by themselves with *pin-types.* These were small pieces of wood about two inches long, having a letter cut in relief on one end, and the same letter formed at the other by steel points. Maps of the world and of the United States were also exhibited, made by perforating the outline from behind. The result of this exhibition was highly satisfactory. In his address, Mr. Friedlander set forth the great advantages that would accrue to the blind by a general system of instruction. He repeated the usual unanswerable arguments against the adoption of *arbitrary* characters, and stenographic or phonetic systems, and strongly recommended the use of our own alphabet. He followed generally Haüy's plan of instruction. Early in 1833, Jacob Snider, a young gentleman, native of Philadelphia, applied his mind to the contrivance of a method of printing in relief. The alphabet at first adopted a mixture of the upper and lower case italics, and the relief was produced by heavy pressure on thick paper between two sheets of copper having the letters deeply cut. The embossing was thus on both sides. His first attempt, after printing a few elementary sheets, was on the Gospel of St. Mark, which he completed by the end of 1833, in a large quarto volume. and published early in January 1834. An account of his first American book for the blind, may be found in Poulson's American Daily Advertiser of the 10th of January, 1834. The four Gospels were soon after printed in Roman capitals; but being found too bulky, and otherwise objectionable, they were abandoned, and a smaller, more compact, and sharper type, in the Roman capitals, was adopted. For the list of books printed at the Philadelphia press, see Table annexed [Table V.].

TABLE V.

| Titles. | Size. | Number of Vols. | Date of Publication. | Number of Pages. | Number of Square Inches in a Page. |
|---|---|---|---|---|---|
| St. Matthew's Gospel | 4to | 1 | 1834 | .. | 60 |
| St. Mark's Gospel | „ | 1 | 1833 | 160 | 60 |
| St. Luke's Gospel | „ | 1 | 1835 | .. | 60 |
| St. John's Gospel | „ | 1 | 1835 | .. | 60 |
| Select Library | folio | 5 | 1839 | 500 | .. |
| Ruth and Esther | „ | 1 | 1838 | 50 | .. |
| Student's Magazine (published monthly) | „ | 6 | 1838–43 | .. | 140 |
| Proverbs | „ | 1 | 1839 | 96 | .. |
| Spelling-Book | „ | 1 | .. | 86 | .. |
| Church Music | „ | 3 | 1840 | 300 | .. |
| Psalms and Hymns | „ | 1 | 1840 | 68 | .. |
| Early Days of Washington, and Declaration of Independence | .. | 1 | 1834 | 71 | .. |
| Die Oster Eier (in German) | „ | 1 | .. | 84 | .. |
| Auswahl (in German) | „ | 1 | .. | 44 | .. |
| French Verbs | „ | 1 | 1839 | 25 | .. |
| Dictionary of Musical Terms | „ | 1 | .. | .. | .. |

It appears that the Boston and Philadelphia Institutions were founded almost simultaneously, and that their presses and system of typography were established without being apprised of the efforts of each other. Time, however, has at length remedied this diversity. The typography of the Philadelphia books is exceedingly well executed, and compares most favourably with the best of the Glasgow books, but the press has ceased to work, and printing in capital letters will not probably be resumed. From the preference which the present distinguished and intelligent Director of the Philadelphia Institution, Mr. William Chapin, late Superintendent of the Ohio Institution, is known to entertain for the Boston system of typography we may reasonably hope that when printing shall be resumed there, it will be with Howe's alphabet. It is the opinion, however, of Mr. Chapin that all the American Institutions should unite, not only in the use of the same alphabet, but that they should all contribute to support one press. It may be remarked here that the pupils in all the American Institutions read fluently in both the upper and lower-case letters, but it is presumed that Philadelphia and Glasgow books will soon be entirely abandoned there; and as the Boston books can now be obtained in London at a price cheaper than any of the five different systems of books printed in Great Britain, it is to be hoped that they will come into general use here. If it be thought that the letters are too small for adults to read with ease, books may be printed with larger types, and even then be less bulky and expensive than any of the systems in arbitrary characters now in use.

In the year 1848 or 1849 the Virginia Institution set up a press, and has printed several elementary and school books. The Boston type is adopted, with the exception that capitals are used at the beginning of sentences and proper names. This alteration, in the opinion of the Jury, is not an improvement, as the blind are thus compelled to learn two alphabets instead of one. The Virginia books are well embossed, and it is hoped that in future books capitals will be omitted.

To the American Bible Society at New York much praise is due for their commendable efforts in the circulation of the Scriptures among the blind. The stereotype plates of the Bible in six volumes, executed at the Boston press, under the superintendence of Dr. Howe, now belong to this Society. They have printed a second edition from the same plates, and annually distribute gratuitously from 100 to 300 volumes.

It had ceased to be a matter of surprise in the United States that the blind could read, before the public attention was loudly called to the subject in Great Britain, for we see that in 1836, there were two active printing establishments for the blind in the United States; by one, the whole of the New Testament had been published in a cheap form, in the common lower-case letters, and by the other the four Gospels in Roman capitals. Let us now return to the Society of Arts of Edinburgh, and their Prize Medal, to which we have already referred. It was not until the 31st of May, 1837, that the Society's Medal was awarded. In 1836, when the 19 different alphabets were before the Committee of the Society, circulars were drawn up and distributed, with specimens of the several alphabets, to the various institutions for the blind in England and Scotland, and every means employed to arrive at a correct result. The opinions of

Mr. Taylor, of York, and Mr. Alston, of Glasgow, seem to have been those which the Society chiefly followed. They were in favour of the common Roman capital letter, merely deprived of the serifs, or small strokes at their extremities, and accordingly the prize was awarded to Dr. Fry, of London; and on the 31st of May, 1837, a Medal was granted to him for the *invention* of an alphabet which appears to have been in use since 1833 in Philadelphia.

On receiving the Society's circular in 1836, submitting the forms of all the competing alphabets to him, Mr. Alston was struck with the simplicity of Fry's, and immediately conceived the idea of making such alterations as he thought necessary, and putting it to the test. The changes made were simply to reduce the size of the letters, and render the faces thinner. On the 26th of October, 1836, he exhibited his first specimen of printing in relief in the Roman capital letter at a public examination of the blind. It was Fry's alphabet slightly changed to improve the sharpness of the embossing. He then made a successful appeal for a printing fund. After great exertions and most commendable perseverance he procured a printing-press, with two founts of type, and the other necessary printing apparatus. In January 1837 he issued a few elementary works. By March 1838 he had made such progress, that the whole of the New Testament was printed in four super-royal 4to volumes. The type is great primer, and there are in the four volumes 623 leaves of 42 lines to a page. In December 1840, Mr. Alston completed the printing of the Old Testament in 15 super-royal quarto volumes, in double pica type. Of nine of the volumes he printed 200, and of the remaining six, 250 copies. There are in all these 15 volumes, 2535 pages, with 37 lines on a page. Mr. Alston was justly proud of his great work, the entire Bible containing the Old and New Testaments in 19 volumes. In his 'Statements of the Education, Employments, and Internal Arrangements adopted at the Asylum for the Blind, Glasgow, with a short account of its Founder, &c.,' 10th Ed., 1846, 8vo, p. 80, he says,

TABLE VI.

| Titles. | Number of Vols. | Size. | Date of Publication | Number of Pages. | Number of Square Inches in a Page. | Price. | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | £ | s. | d. |
| The Bible: the Old Testament complete | 15 | 4to | 1839–40 | 2,535 | 90 | 7 | 10 | 0 |
| „ the New Testament complete (or separately) | 4 | „ | 1838 | 623 | 90 | 2 | 0 | 0 |
| 1. Genesis | 1 | „ | 1840 | 159 | 90 | 0 | 10 | 0 |
| 2. Exodus and Leviticus | 1 | „ | 1840 | 229 | 90 | 0 | 13 | 0 |
| 3. Numbers | 1 | „ | 1840 | 137 | 90 | 0 | 9 | 0 |
| 4. Deuteronomy | 1 | „ | 1840 | 115 | 90 | 0 | 7 | 6 |
| 5. Joshua, Judges, and Ruth | 1 | „ | 1840 | 165 | 90 | 0 | 10 | 0 |
| 6. Samuel | 1 | „ | 1840 | 178 | 90 | 0 | 11 | 0 |
| 7. Kings | 1 | „ | 1840 | 186 | 90 | 0 | 11 | 0 |
| 8. Chronicles | 1 | „ | 1840 | 190 | 90 | 0 | 11 | 0 |
| 9. Ezra, Nehemiah, and Job | 1 | „ | 1840 | 159 | 88 | 0 | 9 | 0 |
| 10. Psalms | 1 | „ | 1840 | 217 | 82 | 0 | 13 | 0 |
| 11. Proverbs, Ecclesiastes, Song of Solomon, and Esther | 1 | „ | 1840 | 127 | 88 | 0 | 8 | 6 |
| 12. Isaiah | 1 | „ | 1840 | 152 | 90 | 0 | 10 | 0 |
| 13. Jeremiah and Lamentations | 1 | „ | 1839 | 188 | 90 | 0 | 11 | 0 |
| 14. Ezekiel | 1 | „ | 1839 | 160 | 90 | 0 | 10 | 0 |
| 15. Daniel to the end | 1 | „ | 1840 | 173 | 90 | 0 | 11 | 0 |
| St. Matthew | 1 | „ | 1839 | 79 | 90 | 0 | 5 | 6 |
| St. Mark | 1 | „ | 1837 | 50 | 90 | 0 | 4 | 0 |
| St. Luke | 1 | „ | 1838 | 84 | 90 | 0 | 5 | 6 |
| St. John | 1 | „ | 1838 | 62 | 90 | 0 | 4 | 6 |
| Acts of the Apostles | 1 | „ | 1843 | 80 | 90 | 0 | 5 | 6 |
| Galatians, Ephesians, Philippians, and Colossians (editions in large type) | 1 | „ | 1845 | 53 | 90 | 0 | 4 | 0 |
| Epistle to the Romans | 1 | „ | 1842 | 42 | 90 | 0 | 4 | 0 |
| Church of England Catechism | 1 | ob. 8vo | n. d. | 16 | 40 | 0 | 1 | 0 |
| Church of Scotland Shorter Catechism | 1 | 4to | 1839 | 32 | 55 | 0 | 2 | 6 |
| Selections from Eminent Authors | 1 | ob. 8vo | 1839 | 23 | 38 | 0 | 1 | 6 |
| Selections of Sacred Poetry, with Tunes | 1 | „ | n. d. | 22 | 40 | 0 | 2 | 0 |
| Map of England and Wales | sheet | folio | n. d. | .. | 285 | 0 | 2 | 0 |
| Specimens of type:—Ruth and James | 1 | 4to | 1837 | 19 | 80 | 0 | 2 | 6 |
| First and Second Book of Lessons | 1 | .. | n. d. | 30 | 42 | 0 | 1 | 6 |
| A Selection of Æsop's Fables, with Woodcuts | 1 | ob. 8vo | 1838 | 28 | 40 | 0 | 2 | 0 |
| Psalms and Paraphrases (Scotch version) | 2 | 4to | 1838 | 342 | 63 | 0 | 16 | 0 |
| Lessons on Religion and Prayer | 1 | ob. 8vo | 1843 | 26 | 44 | 0 | 1 | 6 |
| Psalms and Hymns (version of Tate and Brady) | 1 | folio | 1841 | 207 | 104 | 0 | 12 | 0 |
| Morning and Evening Services (Liturgy) | 1 | 4to | 1839 | 34 | 68 | 0 | 2 | 6 |
| Epitomised History of the Bible (Second Edition) | 1 | „ | n. d. | 37 | 44 | 0 | 2 | 0 |
| Musical Catechism, with Tunes | 1 | „ | 1838 | 38 | 40 | 0 | 3 | 6 |
| English Grammar | 1 | ob. 4to | 1838 | 72 | 67 | 0 | 5 | 0 |
| Todd's Lectures | 3 | ob. 8vo | 1841 | 185 | 53 | 0 | 7 | 6 |
| Description of London, by Chambers | 1 | „ | 1841 | 75 | 48 | 0 | 3 | 0 |
| Meditations on the Sacrament, and Prayers | 1 | 4to | 1843 | 42 | 90 | 0 | 4 | 0 |
| Scottish Songs | 1 | ob. 8vo | 1844 | 25 | 70 | 0 | 3 | 0 |
| Introduction to Astronomy | 1 | „ | 1841 | 32 | 52 | 0 | 3 | 6 |
| Alphabet, on Card | — | „ | n. d. | 1 | 33 | 0 | 0 | 2 |
| Outlines of Natural History (Quadrupeds) | 1 | „ | 1842 | 15 | 38 | 0 | 1 | 0 |

"this is the first Bible ever printed for the blind"; but in this he was evidently in error, as we have shown that the greater part of it had long before been printed in Boston. We allude to these facts merely because it seems a matter of much regret that Mr. Alston should have devoted so much enterprise and money in producing the Scriptures when he might have ascertained that they had already been printed, and could have been bought at less money than it would cost him to print them. The main difference between the Glasgow and the Boston alphabets, is that one is in the upper and the other is in the lower case, which difference is certainly not of sufficient consequence to demand two editions. Had he expended the same energy and money in producing other valuable books, and exchanged them with the Boston and Philadelphia Institutions, as he was urged to do, the three Institutions would have greatly benefited by the large outlay, and the blind of both countries would have had a great increase to their library. On the 18th of January, 1838, the officers of the Philadelphia Institution wrote to Mr. Alston, informing him that they possessed a printing press, and "understanding that you adopt the same character, it appears to our Board of Management, that both Institutions would gain by an interchange of volumes." Mr. Alston at once acceded to this proposition, and immediately shipped 150 volumes, being 10 full sets of the New Testament, and 50 single copies of the Gospels, besides multiplication tables and other works. [For a complete list of the books issued from the Glasgow press since its first establishment see Table VI.]

Since the death of Mr. Alston, on the 20th of August, 1846, the Glasgow press has almost ceased to work. A few of the volumes have been reprinted. It is at present engaged in reprinting the Gospel of St. John and the Acts of the Apostles. Since 1837 it has been almost the only press that has supplied England, Ireland, and Scotland with embossed books in Roman type. These books are typographically well executed, and the Jury think that Mr. Alston and the Glasgow press are deserving of great

TABLE VII.

| Titles. | Number of Vols. | Size. | Date of Publication. | Number of Pages. | Number of Square Inches in a Page. | Price to Subscribers | Price to Non-Subscribers |
|---|---|---|---|---|---|---|---|
| | | | | | | £. s. d. | £. s. d. |
| THE BIBLE AS FAR AS PRINTED .. .. .. .. .. .. | 14 | 4to | 1842–50 | .. | 70 | 4 7 0 | 5 14 4 |
| The New Testament complete .. .. .. .. .. ..<br>(May be had separately.) | 9 | " | 1839–51 | .. | 70 | 1 10 6 | 2 0 0 |
| Genesis, Part I. .. .. .. .. .. .. .. .. .. .. | 1 | " | 1843 | 113 | 70 | 0 4 0 | 0 5 4 |
| Genesis, Part II., and Exodus, Part I. .. .. .. .. | 1 | " | 1843 | 112 | 70 | 0 4 0 | 0 5 4 |
| Exodus, Part II. .. .. .. .. .. .. .. .. .. .. | 1 | " | 1843 | 110 | 70 | 0 4 0 | 0 5 4 |
| Numbers, Part I. .. .. .. .. .. .. .. .. .. .. | 1 | " | 1849 | 139 | 70 | 0 4 6 | 0 5 6 |
| Numbers, Part II., and Deuteronomy, Part I. .. .. | 1 | " | 1849 | 117 | 70 | 0 4 0 | 0 5 4 |
| Deuteronomy, Part II., and Joshua, Part I. .. .. .. | 1 | " | 1850 | 123 | 70 | 0 5 0 | 0 6 0 |
| Psalms, Part I. .. .. .. .. .. .. .. .. .. .. | 1 | " | 1842 | 95 | 70 | 0 3 6 | 0 4 8 |
| Psalms, Part II. .. .. .. .. .. .. .. .. .. .. | 1 | " | .. | .. | 70 | 0 4 0 | 0 5 4 |
| Proverbs, Ecclesiastes, and Song of Solomon .. .. | 1 | " | 1849 | 111 | 70 | 0 4 6 | 0 5 6 |
| Isaiah, Part I... .. .. .. .. .. .. .. .. .. .. | 1 | " | 1844 | 98 | 70 | 0 3 6 | 0 4 8 |
| Isaiah, Part II., and Hosea .. .. .. .. .. .. .. | 1 | " | 1844 | 98 | 70 | 0 3 6 | 0 4 8 |
| Jeremiah, Part I. .. .. .. .. .. .. .. .. .. .. | 1 | " | 1847 | 104 | 70 | 0 4 0 | 0 5 4 |
| Jeremiah, Part II. .. .. .. .. .. .. .. .. .. .. | 1 | " | 1848 | 109 | 70 | 0 4 0 | 0 5 4 |
| Joel to Malachi .. .. .. .. .. .. .. .. .. .. | 1 | " | 1846 | 119 | 70 | 0 4 0 | 0 5 4 |
| Matthew, New Edition .. .. .. .. .. .. .. .. .. | 1 | " | 1846 | 108 | 70 | 0 4 0 | 0 5 4 |
| Mark .. .. .. .. .. .. .. .. .. .. .. .. .. | 1 | " | .. | 71 | 70 | 0 3 0 | 0 4 0 |
| Luke, New Edition .. .. .. .. .. .. .. .. .. .. | 1 | " | 1851 | 119 | 70 | 0 4 0 | 0 5 4 |
| John, New Edition .. .. .. .. .. .. .. .. .. .. | 1 | " | 1846 | 86 | 70 | 0 3 0 | 0 4 0 |
| Acts, New Edition .. .. .. .. .. .. .. .. .. .. | 1 | " | 1845 | 120 | 70 | 0 4 0 | 0 5 4 |
| Romans .. .. .. .. .. .. .. .. .. .. .. .. .. | 1 | " | 1841 | 41 | 70 | 0 2 0 | 0 2 8 |
| Corinthians to Ephesians, inclusive .. .. .. .. .. | 1 | " | 1844 | 100 | 70 | 0 3 6 | 0 4 8 |
| Philippians to Hebrews, inclusive.. .. .. .. .. .. | 1 | " | 1844 | 95 | 70 | 0 3 6 | 0 4 8 |
| James to Revelation, inclusive .. .. .. .. .. .. | 1 | " | 1844 | 101 | 70 | 0 3 6 | 0 4 8 |
| Liturgy, Select Portions .. .. .. .. .. .. .. .. | 1 | " | 1849 | 111 | 70 | 0 4 6 | 0 5 6 |
| Prayer-book Psalms, Part I. .. .. .. .. .. .. .. | 1 | " | 1849 | 104 | 70 | 0 4 0 | 0 5 4 |
| Prayer-book Psalms, Part II... .. .. .. .. .. .. | 1 | " | 1849 | 95 | 70 | 0 4 0 | 0 5 4 |
| Prayers and Hymns .. .. .. .. .. .. .. .. .. | 1 | " | 1842 | 109 | 70 | 0 4 0 | 0 5 4 |
| Hymn-book, embossed by the Blind Pupils .. .. .. .. | 1 | 8vo | 1845 | 72 | 70 | 0 2 0 | 0 2 8 |
| Scripture Lessons .. .. .. .. .. .. .. .. .. .. | 1 | .. | .. | .. | .. | 0 0 6 | 0 0 8 |
| First-Class Book .. .. .. .. .. .. .. .. .. .. | 1 | .. | .. | .. | .. | 0 0 6 | 0 0 8 |
| Second-Class Book .. .. .. .. .. .. .. .. .. .. | 1 | .. | .. | .. | .. | 0 0 6 | 0 0 8 |
| Tin-foil Alphabet .. .. .. .. .. .. .. .. .. .. | .. | .. | .. | .. | .. | 0 0 6 | 0 0 8 |
| Card Alphabet .. .. .. .. .. .. .. .. .. .. .. | .. | .. | .. | .. | .. | 0 0 2 | 0 0 3 |
| Ciphering Board and Type .. .. .. .. .. .. .. .. | .. | .. | .. | .. | .. | 0 17 6 | 1 0 0 |
| Raised Maps of Europe, Asia, Africa, America, (North and South), each .. .. .. .. .. .. .. .. .. | .. | .. | .. | .. | .. | 0 15 0 | 0 17 6 |
| An Apparatus for embossing in Lucas's System, adapted by Mr. Wood, the Master .. .. .. .. .. .. .. | .. | .. | .. | .. | .. | 0 15 0 | 0 17 6 |
| The Figures of the First Book of Euclid's Elements of Geometry, on Five Boards, by Mr. Wood, each .. | .. | .. | .. | .. | .. | 0 10 6 | 0 12 0 |
| A Chess-Board, adapted to the use of the Blind, by Mr. Wood .. .. .. .. .. .. .. .. .. .. | .. | .. | .. | .. | .. | 0 9 0 | 0 11 0 |
| The Book of the Prophet Ezekiel, and a New Edition of the Psalms (Bible version) are in course of preparation .. .. .. .. .. .. .. .. .. .. | .. | .. | .. | .. | .. | .. | .. |

praise. The objections, however, to the small Roman capitals, in which most of the books are printed, are such that it is to be hoped that ere long this press will follow the example of that at Philadelphia, and adopt Howe's typography.

It has generally been supposed that the Glasgow press was the only one in Great Britain that printed anything of consequence in the common letter. But we cannot omit to mention a valuable work that has come under our notice; it is a 'Magazine for the Blind.' London: Simpkin, Marshall, & Co., Stationers' Hall Court; price 6*s.*; in twelve monthly parts. 1839–40. After two volumes were printed the first Magazine for the Blind in this country was discontinued. It is in quarto form, and has 23 lines on a full page. The type is the ordinary mixture of the upper and lower case of Roman letter, and the work is beautifully printed. The first volume contains 78 pages, and the second 73. It is to be regretted that so valuable a contribution to the literature of the blind should not have found better support. It consists of miscellaneous information, with fragments of authors, poetry, anecdotes, woodcuts, &c.

In 1806 an Institution for the Blind was established at Stockholm, and it is with pleasure that we learn that Mr. Watts, of Crown Court, London, has, at the expense of the British and Foreign Bible Society, printed in relief, with the ordinary Roman type, in capitals and lower-case, the Gospel according to St. Luke in Swedish for this Institution. The volume was printed in 1848, and is a beautiful specimen of embossed typography. It is in quarto, consisting of 132 pages, 27 lines on a page of 70 square inches. Price, as sold by the Bible Society at cost, 6*s.*; 500 copies were printed.

In France, Belgium, Prussia, Austria, Switzerland, Sweden, and the United States, the Roman lower-case alphabet is used. In most, if not all, of these countries, the Institutions for the Blind are supported and partially controlled by Government, and perhaps this is the reason why in all of them nearly the same system of typography prevails.

In Great Britain, however, the case is different. There are now five entirely different systems of typography in use here, and vigorously pressed upon the benevolent public. The unfortunate blind are thus deprived of the advantages they might have if harmony of action and uniformity of typography were adopted. This diversity of opinion is causing great injustice to them, and the Jury cannot but urge upon the parties concerned the speedy adoption of some one system throughout the country. Our opinion is decidedly in favour of Howe's American typography. Perfection is not claimed for this system, but it seems to us that there are fewer objections to it than to any of the others, and it may be the more easily improved; but any one of the five principal systems now used in England is far better than so many. The present state of printing in the Roman character in Great Britain is, as we have seen already, that every press has been stopped, while the books in arbitrary characters seem to be increasing and gaining public favour. The principal of these is one known as Lucas's. It was devised by T. M. Lucas, of Bristol, about the year 1835. It consists of arbitrary characters, and is said to be founded on Byron's system of stenography. It is simple, speedily learned, and easily read by the touch, and is generally acknowledged to be of all the arbitrary systems the best. The printing in this system began at Bristol, and the following are the works published there:—

1. The Gospel according to St. John, edited by T. M. Lucas, inventor of the system for teaching the blind to read by embossed stenographic character; July 1837; Bristol; in 4to, 66 pages, and 27 lines to a page. Two pages are pasted together.
2. The Acts of the Apostles (according to the authorised version), in T. M. Lucas's embossed stenographic character; 1838. Published under the direction of the Bristol Society for Embossing and Circulating the Authorised Version of the Bible for the use of the Blind; Bristol; in 4to, 118 pages, 27 lines on a page.

This second publication of Mr. Lucas was announced as containing some improvements, as widening the spaces and lessening the abbreviations.

3. The Gospel according to St. Matthew (according to the authorised version), in T. M. Lucas's embossed stenographic character; 1839. Published, &c.; Bristol; 4to, 116 pages. In this third publica-

TABLE VIII.

| Titles. | Number of Vols. | Size. | Date of Publication. | Number of Pages. | Number of Square Inches in a Page. | Price. |
|---|---|---|---|---|---|---|
| | | | | | | £ s. d. |
| THE NEW TESTAMENT complete | 8 | ob. 4to | 1839–51 | 723 | 110 | 2 10 0 |
| THE OLD TESTAMENT as far as printed | 7 | ” | .. | 811 | 110 | 2 0 0 |
| (Each Volume sold separately.) | | | | | | |
| Matthew | 1 | ” | .. | 83 | 110 | 0 6 0 |
| Mark | 1 | ” | .. | 72 | 110 | 0 5 6 |
| Luke | 1 | ” | .. | 88 | 110 | 0 7 0 |
| St. John | 1 | ” | .. | 96 | 110 | 0 5 6 |
| Acts | 1 | ” | .. | 110 | 110 | 0 7 0 |
| Romans to Corinthians | 1 | ” | .. | 89 | 110 | 0 6 0 |
| Galatians to Philemon | 1 | ” | .. | 74 | 110 | 0 5 6 |
| Hebrews to Revelation | 1 | ” | .. | 111 | 110 | 0 7 0 |
| Genesis | 1 | ” | .. | 132 | 110 | 0 8 0 |
| Exodus | 1 | ” | 1843 | 112 | 110 | 0 7 0 |
| Joshua | 1 | ” | 1852 | 65 | 110 | 0 3 6 |
| Judges | 1 | ” | 1852 | 65 | 110 | 0 3 6 |
| Proverbs and Ecclesiastes | 1 | ” | .. | 76 | 110 | 0 5 0 |
| Isaiah | 1 | ” | 1843 | 128 | 110 | 0 7 6 |
| Daniel, Esther, and Ruth | 1 | ” | .. | 69 | 110 | 0 5 6 |
| Psalms (Prayer Book Version) | 2 | ” | .. | 164 | 110 | 0 12 0 |
| Grammar | 1 | ” | .. | 13 | 110 | 0 1 0 |
| Morning and Evening Prayer | 1 | ” | .. | 33 | 70 | 0 2 0 |
| Hymns from Cowper and Newton | 1 | ” | .. | 40 | 70 | 0 2 0 |
| Five Addresses to those who wish to go to Heaven | 1 | ” | .. | 21 | 110 | 0 1 6 |

tion is announced the firm conviction that this system will prevail over any other plan, on account of its tangibility.

4. The Gospel according to St. Mark, &c. Bristol, 1840; 4to, 71 pages.

The above, with the exception of a few small elementary works, are, we believe, all that appeared at Bristol. In the year 1839 a Society was formed called "The London Society for teaching the Blind to Read." They adopted Lucas's system, and have been gradually improving it. The following year the types and printing apparatus were transferred from Bristol to London, and in 1841 the Society issued the Epistle to the Romans. Since then their press has not been idle, as the list in Table VII. will show. The printing is now done by the blind at the Institution in the Avenue Road, Regent's Park.

In May 1838 the "London and Blackheath Association for embossing the Scriptures in various languages, and for teaching the Blind to read on the Phonetic System," was established. Its object is to stereotype the Holy Scriptures in James Hartley Frere's phonetic characters. About the year 1839 Mr. Frere devised a cheap plan for embossing or stereotyping. It consists simply of small wires, drawn with angles laid down upon tin plates. The wires are bent and cut by means of ingenious spindles to form the characters, which are similar to those of Gurney's system of shorthand. The wires are attached to the plate by heating it sufficiently to melt the coating of tin, into which the wire sinks, and is fast when cold. The common printing press is used in embossing. Mr. Frere's books are read from left to right and back, after the manner of the ancient Greek boustrophedon writing. Mr. Frere's books are well embossed, and from his plates the books can be printed as they are wanted. The objections to phonetic alphabets are obvious. Mr. Frere, however, does not claim to supersede the common spelling, or the common printing, or common embossing, but to form an easy introduction to them [For a complete list of Mr. Frere's books see Table VIII.]

More recently still another system has been devised by Mr. W. Moon, Master of the Brighton Blind Asylum. The characters are arbitrary, though Mr. Moon defines them as the "Common Alphabet Simplified." He claims also a new mode of stereotyping, by which the characters are rendered sharp and prominent. The lines are read forwards and back like Frere's plan, and it is even more bulky and expensive than his. The new mode of stereotyping is believed to be quite the same as Frere's, by means of wires laid on tin plates. We subjoin a list of Mr. Moon's publications [Table IX.]

The different sizes of the print are distinguished thus:

1. Lines very wide apart, for beginners.
2. „ wide.
3. „ nearer.
4. „ flatter as well as nearer.

Table IX.

| Size of Print. | Titles. | Number of Vols. | Size. | Date of Publication. | Number of Pages. | Number of Square Inches in a Page. | Price. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | £. | s. | d. |
| .. | The New Testament complete .. .. .. .. (Volumes sold separately.) | 9 | ob. 4to | 1848–51 | .. | 110 | | .. | |
| 2 | Psalms .. .. .. .. .. .. .. .. .. .. | 1 | „ | 1851 | .. | 110 | 1 | 1 | 0 |
| 3 | St. Matthew's Gospel .. .. .. .. .. .. .. | 1 | „ | 1849 | .. | 110 | 0 | 12 | 0 |
| 3 | St. Mark's Gospel .. .. .. .. .. .. .. | 1 | „ | 1849 | .. | 110 | 0 | 7 | 0 |
| 2 | St. Luke's Gospel .. .. .. .. .. .. .. | 1 | „ | .. | .. | 110 | 0 | 13 | 0 |
| 2 | St. John's Gospel .. .. .. .. .. .. .. | 1 | „ | 1848 | .. | 110 | 0 | 8 | 0 |
| 3 | The Acts of the Apostles .. .. .. .. .. .. | 1 | „ | 1849 | .. | 110 | 0 | 13 | 0 |
| 2 | Romans and Corinthians .. .. .. .. .. .. | 1 | „ | 1850 | .. | 110 | 0 | 12 | 0 |
| 4 | Galatians to Philemon .. .. .. .. .. .. | 1 | „ | 1849 | .. | 110 | 0 | 7 | 0 |
| 2 | Epistle to the Hebrews—James, Peter, John and Jude | 1 | „ | 1850 | .. | 110 | 0 | 10 | 6 |
| 3 | Revelation .. .. .. .. .. .. .. .. .. | 1 | „ | 1851 | .. | 110 | 0 | 7 | 0 |
| 2 | 1st, 2nd, and 3rd Epistles of St. John .. .. .. | 1 | ob. 8vo | 1851 | .. | 50 | 0 | 4 | 0 |
| 1 | St. John's Gospel, Chapters XIV. and XV., each .. | 2 | „ | 1850 | 20 + 18 | 50 | 0 | 1<br>each | 6 |
| 1 | Epistle to the Hebrews, Chapter XII. .. .. .. | 1 | „ | 1851 | 15 | 50 | 0 | 1 | 6 |
| 1 | Isaiah LIII. and Psalms XXIII. and CXXV. .. .. | 1 | „ | 1851 | .. | 50 | 0 | 1 | 6 |
| 1 | First Lesson Book, containing Freeman's Card and Scripture Texts .. .. .. .. .. .. .. | 1 | „ | 1850 | 19 | 50 | 0 | 1 | 6 |
| 1 | Morning and Evening Devotions .. .. .. .. | 1 | „ | 1847–50 | .. | 50 | 0 | 6 | 0 |
| 4 | The Last Days of Polycarp .. .. .. .. .. | 1 | „ | 1847 | 10 | 50 | 0 | 1 | 0 |
| 4 | The Last Days of Cranmer .. .. .. .. .. .. | 1 | „ | 1847 | .. | 50 | 0 | 1 | 6 |
| 1 | The Cataract of Niagara .. . .. .. .. .. | 1 | ob. 8vo | 1849 | 13 | 50 | 0 | 1 | 2 |
| 4 | A Remarkable Tiger Hunt .. .. .. .. .. .. | 1 | „ | 1847 | .. | 50 | 0 | 1 | 6 |
| 4 | The Seaman's Leap for Life .. .. .. .. .. | 1 | „ | 1847 | .. | 50 | 0 | 1 | 0 |
| 4 | The Sagacity of a Lioness .. .. .. .. .. .. | 1 | „ | 1847 | 7 | 50 | 0 | 1 | 0 |
| 4 | Anecdotes of Two Dogs .. .. .. .. .. .. | 1 | „ | .. | 8 | 50 | 0 | 1 | 0 |
| 1 | The Lord's Prayer in English .. .. .. .. .. | sheet | .. | .. | .. | .. | 0 | 0 | 4 |
| 1 | The Lord's Prayer in the Irish, French, Spanish, German, Italian, and Chinese Languages, each .. .. | sheets | .. | 1849 | .. | .. | 0 | 0 | 6 |
| .. | Animals, various, each .. .. .. .. .. .. | sheet | .. | 1851 | .. | .. | 0 | 0 | 6 |
| .. | Mathematical Diagrams from Euclid .. .. .. | 1 | .. | 1851 | .. | .. | 1 | 1 | 0 |
| .. | Patterns for Knitting .. .. .. .. .. .. .. | 1 | .. | 1851 | .. | .. | 0 | 3 | 0 |
| .. | Hymns arranged for four voices .. .. .. .. | 1 | .. | 1851 | .. | .. | 0 | 10 | 6 |
| .. | Hymn Tunes, arranged for the Pianoforte .. .. | 1 | .. | 1851 | .. | .. | 0 | 10 | 6 |
| .. | Maps—Africa, North America, South America, Ireland, Palestine, Jerusalem, and British Isles, each | sheets | .. | 1849 | .. | .. | 0 | 1 | 0 |
| .. | Hymn for the Blind .. .. .. .. .. .. .. | 1 | ob. 8vo | 1851 | 6 | 50 | 0 | 1 | 0 |
| .. | English Dictionary (begun 1850) .. .. .. .. | 1 | ob. 4to | 1850 | .. | .. | | .. | |

If now the New Testament, printed in all the six systems used in the English language, be taken as a standard of comparison, the following table will show the results:

TABLE X.

| Systems. | Number of Vols. | Size. | Number of Pages. | Number of Lines in a Page. | Number of Square Inches in a Page. | Price. | | |
|---|---|---|---|---|---|---|---|---|
| The New Testament:— | | | | | | £ | s. | d. |
| Howe's .. .. .. | 2 | 4to | 430 | .. | 117 | 0 | 16 | 0 |
| Alston's .. .. .. | 4 | " | 623 | 42 | 90 | 2 | 0 | 0 |
| Gall's .. .. .. | 8 | " | .. | 28 | 70 | 2 | 0 | 0 |
| Lucas's .. .. .. | 9 | " | 841 | 27 | 70 | 2 | 0 | 0 |
| Frere's .. .. .. | 8 | ob. 4to | 723 | .. | 110 | 2 | 10 | 0 |
| Moon's .. .. .. | 9 | " | .. | 25 | 110 | 4 | 10 | 0 |

By a comparison of all these lists it will be found that Howe's books are not only much less in bulk than any of the others, but are also much cheaper.

### APPARATUS AND BOOKS FOR THE BLIND.*

*England.*—Mr. E. A. HUGHES (20, p. 537), of Mount Row, Westminster Road, exhibited a machine for enabling persons born blind to write, in raised characters, without using types; a machine to write with a pen or pencil in skeleton Roman capitals; a machine to cast accounts and make general arithmetical calculations by tangible characters; a machine to copy and compose music on paper, &c. Mr. WEDGWOOD, of Lombard Street, exhibited an improved noctograph, useful to persons who have become blind *after having learnt to write.*

THE SOCIETY FOR TEACHING THE BLIND TO READ (198, pp. 550, 551), Avenue Road, Regent's Park, exhibited embossed books for the blind; ciphering boards for the blind; maps for the blind; geometrical boards for the blind; apparatus invented by Mr. W. Wood for enabling the blind to emboss Lucas's characters, and thus to communicate with each other; a specimen of music, by Mr. Wood, for the blind, in raised characters; and chess-boards for the blind. The system adopted is Lucas's, which has already been fully described, and has the objection of being in arbitrary characters: this also applies to the machine. This is a well-established Institution, and great pains were taken during the whole of the Exhibition by the master, Mr. Wood, to demonstrate the successful operation of the various plans he has adopted to educate blind persons.

Mr. JAMES GALL, Myrtle Bank, Edinburgh (171, p. 548), exhibited Gall's triangular alphabet for the blind, which, by its similarity to the Roman alphabet, is said to be easily read by eye and touch without previous instruction. A volume, containing the Epistle to the Ephesians, printed with this alphabet, and Gall's apparatus for writing by and to the blind. The apparatus consists of a stuffed frame, on which paper is placed; of a cover with bars to guide the lines, which are written from the bottom upwards; and of small stamps, with the letters formed of common pins, which are pricked through the paper and read on the opposite side.

THE EDINBURGH SCHOOL FOR THE BLIND, Abbey Hill, Edinburgh (170, p. 548), exhibited Dr. Foulis' tangible ink for the blind. This ink contains a large quantity of solid matter, which is deposited on the paper, so as to present a raised surface to the finger. Dr. Foulis' manuscript music notation for the blind. Mr. Gall's typhlograph for the blind. Mr. Gall's system of arithmetic for the blind, accomplished by common pins stuck into a pincushion, and Mr. Gall's types for correspondence, by which blind persons can correspond with one another, or jot down memoranda for private use. Dr. Foulis' tangible ink appears to present some advantages, and will probably become a useful adjunct to the numerous means devised for the instruction of the blind, and for enabling them to read and write. The letters on the specimens exhibited were sufficiently raised to be quite perceptible to the touch.

### APPARATUS, &c., FOR THE BLIND—UNITED STATES.

Mr. C. STARR, of New York (89, p. 1438), exhibited books for the blind. Two Bibles, embossed with Dr. Howe's characters. Two leaves are pasted together, and a stout strip of paper stuck between and around these leaves, so as to form a rim to prevent the characters from being flattened on shutting and opening the book. This plan has also the same advantage as if each leaf were printed on both sides. The types are rather small, but the whole work is one of merit.

Dr. S. G. HOWE, Boston (439, p. 1463), exhibited books for the blind. His system has been fully described, and to it the Jury give the preference above all others.

Mr. DODGE, Superintendent of the American Department, exhibited Xenophon and Virgil; characters on Dr. Fry's plan, known as the Glasgow type, all in Roman capitals. This is the system adopted at the Manchester School for the Blind. It has been in use for about fifteen years.

THE INSTITUTE FOR THE BLIND, Staunton, Virginia, exhibited specimens of books and types for the blind. The characters are capitals and lower-case; the printing is sharp and good.

### APPARATUS, &c., FOR THE BLIND—FRANCE.

M. MARCELLIN LEGRAND, Paris (584, p. 1206), exhibited type-plates to print in relief for the blind. The characters are rather too small, and possess the disadvantage of having both capitals and small letters.

### APPARATUS, &c., FOR THE BLIND—AUSTRIA.

G. B MARCHESI, of Lodi (139, p. 1014), exhibited a writing machine for the blind, producing the characters in black or in relief. The letters are formed with pin points, and they are sufficiently tangible; but having capitals and small letters, this plan offers the disadvantage that two alphabets have to be learnt.

### APPARATUS, &c., FOR THE BLIND—BAVARIA.

MM. FEHR and EISENRING, Augsburg (2 Zollv. 54, p. 1100), exhibited metal plates, with letters and characters in relief. The letters are too broad, and are not well adapted for the blind.

The Jury beg to suggest that a uniform system should be adopted, and that in future all books printed for the blind should be printed in the same character. Dr. Howe's plan appears simple, easy, and fit for general adoption.

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* 'Reports of the Juries,' p. 422.

LONDON: PRINTED BY WILLIAM CLOWES AND SONS, LIMITED, STAMFORD STREET AND CHARING CROSS.

REPRINT, 1889.

# THE BLIND.

*FROM*

The English Cyclopædia.

CONDUCTED BY

CHARLES KNIGHT.

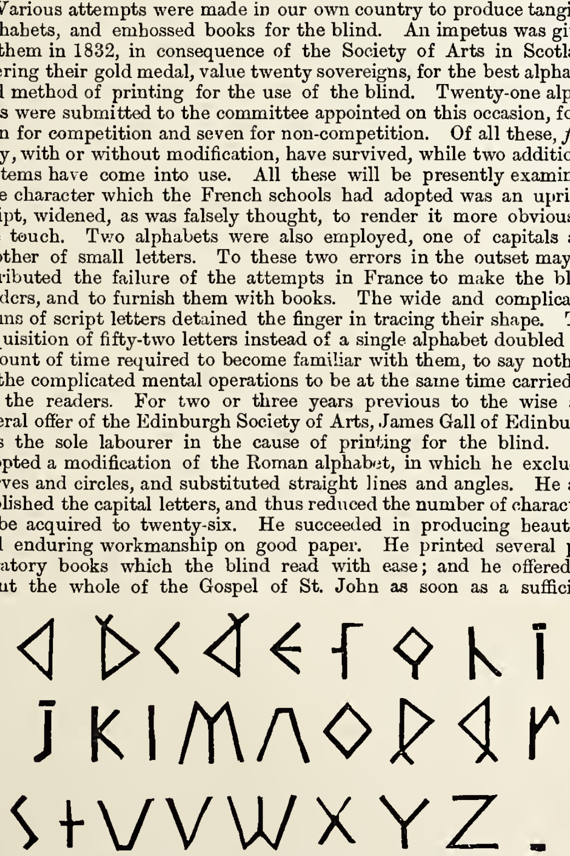
1859.

young, which however are undoubtedly deposited on the plants by the parent insect.

BLIND, ALPHABETS FOR THE. The early instructors of the blind felt the irksomeness of oral instruction, and the dependent condition of their pupils. Without being aware what results might follow they early made the first step towards tangible printing, by the invention of letters in relief, by which the alphabet might be taught—letters put together to form words, and these arranged in sentences. In the first attempt thus made, the letters chosen were those of the Illyrian or Sclavonian alphabet modified. [ALPHABET]. This alphabet was doubtless preferred on account of the square form of the letters, which it was thought would make them more obvious to the touch than ours. ('Essai sur l'Instruction des Aveugles,' &c., par le Docteur Guillié, p. 134, 2nde edition.) The principle of square or angular letters was afterwards abandoned, as "not offering greater advantages than common characters." Moveable letters were next invented, which were placed on small tablets of wood, and were made to slide in grooves, on a similar plan to some of the toys which are used for the purpose of inducing children to learn their letters, spelling, &c. It was with similar letters that Usher, archbishop of Armagh, was taught by his two aunts who were both blind; but this process was found defective for teaching blind persons. Moveable leaden characters were afterwards cast for the use of the blind, by Pierre Moreau, a notary of Paris; but the work was attended with difficulties and expenses which he was not prepared to encounter. Large pin-cushions were also brought into use for the blind, on which the characters were figured with 'inverted needles.' The relief caused by the heads of pins would have been more eligible. Various other attempts were made in wood and metal till the time of Haüy, who invented the art of printing in relief for the blind, and thus devised a plan by which the blind man might acquire knowledge, and derive amusement during his solitary hours independent of a teacher or an attendant. The invention of printing in relief is said to have arisen from the sight and feeling of a proof of common printing fresh from the press.

Previous to the time of M. Haüy no success had been obtained in the art of printing for the blind, though it had been attempted in a variety of ways, and by different persons. Letters were engraved in wood, not cut in relief, but in the ordinary manner of wood-cutting. The configurations of the letters were found to be difficult to trace, possessing none of the advantages which letters in relief afford. Haüy's was a bolder invention than any other offered to the public. Not only has it never been superseded, but from it have arisen all the modern efforts to teach the blind reading by means of relief characters.

Various attempts were made in our own country to produce tangible alphabets, and embossed books for the blind. An impetus was given to them in 1832, in consequence of the Society of Arts in Scotland offering their gold medal, value twenty sovereigns, for the best alphabet and method of printing for the use of the blind. Twenty-one alphabets were submitted to the committee appointed on this occasion, fourteen for competition and seven for non-competition. Of all these, *four* only, with or without modification, have survived, while two additional systems have come into use. All these will be presently examined. The character which the French schools had adopted was an upright script, widened, as was falsely thought, to render it more obvious to the touch. Two alphabets were also employed, one of capitals and another of small letters. To these two errors in the outset may be attributed the failure of the attempts in France to make the blind readers, and to furnish them with books. The wide and complicated forms of script letters detained the finger in tracing their shape. The acquisition of fifty-two letters instead of a single alphabet doubled the amount of time required to become familiar with them, to say nothing of the complicated mental operations to be at the same time carried on by the readers. For two or three years previous to the wise and liberal offer of the Edinburgh Society of Arts, James Gall of Edinburgh was the sole labourer in the cause of printing for the blind. He adopted a modification of the Roman alphabet, in which he excluded curves and circles, and substituted straight lines and angles. He also abolished the capital letters, and thus reduced the number of characters to be acquired to twenty-six. He succeeded in producing beautiful and enduring workmanship on good paper. He printed several preparatory books which the blind read with ease; and he offered to print the whole of the Gospel of St. John as soon as a sufficient number of subscribers should be obtained, at a guinea a copy. The immense cost of a single gospel acted as a great discouragement to his plans, and before he could remedy it other labourers were in the field, and his market was in the possession of other producers. Great merit is however due to Gall, and he must be looked upon as the forerunner of that success which has followed the labours of others. He had removed some difficulties. The works of the French were bulky and expensive; by Gall's angular alphabet much economy in space was gained, and experience proved that it possessed merits of tangibility not to be found in the French alphabets.

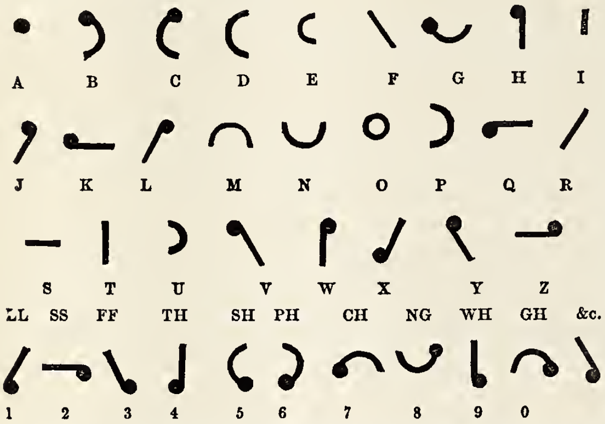


The character which found the greatest favour with the committee appointed to award the gold medal of the society, was the Roman letter of Dr. Fry, to which the prize was finally awarded. But the committee, before deciding, called in the aid of several experienced men to assist them in coming to a right judgment; among others, the Rev. W. Taylor, a gentleman who had been practically engaged in inventions for, and in the instruction of the blind for many years. He was an honorary member of their society, and at the time when his opinion was sought, he was at the head of the recently established School for the Blind at York. Better aid the society could not have procured. To him all the alphabets and communications were submitted, and upon them he made a very copious and able report. Mr. Taylor sets out with saying there does not appear to him "*sufficient* reason for departing from the *common Roman letter*." He then mentions a few modifications which he would introduce in Dr. Fry's sans-serif Roman capital, and speaks decidedly against any merely arbitrary character. It is unnecessary to go into Mr. Taylor's report in all its details. The practical part of the subject was taken up by the late Mr. Alston, then the Treasurer of the Asylum for the Blind in Glasgow; he found the letters of Dr. Fry too broad in the relief, and increased their tangibility by having them made sharper; some other slight alterations were also introduced by his skill and experience. The encouraging approval of his efforts by many of the schools for the blind, together with the pecuniary aid they and the various Bible Societies afforded by the purchase of his books, enabled him to print the entire Scriptures in the course of a few years, as well as some elementary books, and others of more general interest. The Society of Arts for Scotland did not leave his efforts unrewarded, but gratified him and encouraged him to persevere by presenting him with the silver medal of the society in 1838, for his Fables with wood-cut illustrations, printed in relief, and subsequently with three honorary medals for his continued exertions on behalf of the blind.

The decision of the committee of the Society of Arts in 1837, is worthy of being recorded. For five years the subject had been under consideration, and the aid of the most intelligent and practical teachers in the kingdom had been obtained. It appeared to that committee: "1. That although an arbitrary character might possess in itself superior advantages in simplicity and tangibility, yet there would be great, and in many cases insuperable obstacles to the blind generally acquiring a knowledge of any character not familiar to those possessed of sight, and consequently, such an alphabet would not be generally adopted throughout Europe and America. 2. That the same objection applies, although perhaps in a less degree, to Mr. Gall's angular modification of the Roman alphabet; and while the want of capitals and the difficulty of tracing the lines are said to be also serious objections to the use of his character, it does not in other respects seem to offer sufficient reasons for its adoption in preference to the Roman alphabet slightly modified. 3. That, from being almost universally known both in Europe and America, and taking all other circumstances into consideration, the common Roman capital alphabet, as represented by the late Dr. Fry, * * * seems not only the best adapted for teaching the blind to read, but also as a medium of written correspondence. Hence, there is every reason to believe, that it would be sooner brought into general use than any of the other characters in competition—that books printed with it would be more in demand—and, consequently, that their expense would be greatly diminished." The committee guard themselves against the one or two inherent defects in Dr. Fry's alphabet by further stating, that in proposing his communication as best entitled to the society's premium, they "do not wish it to be understood that they consider his modification of the Roman alphabet as *now* in every respect the best adapted for teaching the blind, but only that it was superior to any of the others given in to the society for competition, and remitted to the committee for consideration," and they then allude to the improvements on it since proposed and partly carried into effect by the Rev. Mr. Taylor, Mr. Anderson, of York, and Mr. Alston, of Glasgow.

ABCDEFGHIJKLMNO
PQRSTUVWXYZ&.
1234567890,;:._!?()

One of the alphabets submitted for competition, was of stenographic characters, the invention of Mr. T. M. Lucas, of Bristol. As this alphabet has many adherents it claims respectful notice, premising that it was in use some years before the Society of Arts arrived at its decision, and that its claims were very ably advocated by the late Rev. Dr. Carpenter, LL.D., of Bristol, whose letter addressed to the society, contains many valuable suggestions on printing for the blind. Mr. Lucas has himself stated that the 'Penny Cyclopædia' contained a fair exposition of his principles, which we are glad to reproduce:—"The characters are employed for reading, writing, arithmetic, and music; and they are so simple, that to any book for the blind, not more than half the number of types are required that are necessary to print the same for those who are blessed with sight. Should the event prove as successful as is intimated in the above announcement, and so great a barrier to the improvement of the blind be removed, it will be desirable that the different institutions should unite their exertions, and set apart a common fund to supply their pupils, as well as other blind persons, with so powerful an auxiliary to their progress in knowledge. The alphabet is composed of thirteen simple characters, and thirteen formed from the roots of these with a crotchet-head to each. There are ten double letters from the same roots, distinguished also by the crochet-head: these also represent the nine figures and the cypher, whether used as numerals or ordinals. In all thirty-six characters are employed. The advantages attending the use of stenographic characters seem to be in the saving of types, paper, and labour, thus materially diminishing the cost of books for the blind. The disadvantages attending the system we are speaking of appear to consist chiefly in the confusion which the learner must feel in having but one character employed in several offices, as in the double letters, numerals, and ordinals, and in the necessity that every person should be a stenographist who communicates with the blind by writing. These difficulties are not very great for persons to overcome who have never been accustomed to a written language.



"The manner in which the characters of Mr. Lucas are employed may be seen in the following commencement of St. John's Gospel, only that we give the extract in Roman letters instead of using the stenographic characters.

t gospl b st jon, chap: 1.

in t bgini ws t wrd a t w ws w g, a t w ws g. t sam ws n t bgini w g. l thins wr mad b hm, a wo hm ws nt athin mad tht ws mad. in hm ws lif a t l ws t lit f mn.

"It will be observed that the repetition of numerous letters is avoided; particles are represented in most instances by their initial letter, and when a word, having been once mentioned, recurs immediately, or frequently, it is represented by its initial letter also."

An undoubted defect in Lucas's system is the confusion which must arise from having double letters and figures, whether cardinal or ordinal, represented by the same stenographic signs; thus the signs for th, ch, and ll also represent 471. The contractions are very numerous, many words are expressed by a single character, and other words are contracted by the omission both of vowels and consonants. The value of full spelling is great, especially to the young blind; those who have already learned to read while possessing sight, would, in time, get over the difficulties the system presents.

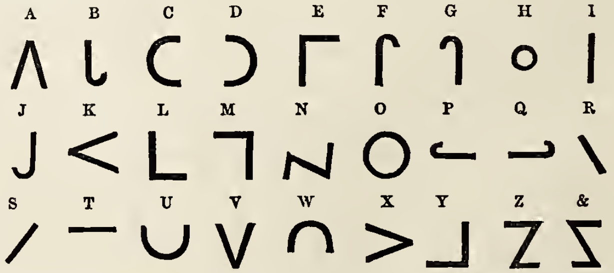
The next system which came into use in point of time was Frere's, also stenographic, founded on Gurney's shorthand, as Lucas's was on Byrom's. This system is phonetic, and is formed on the "combination of elementary sounds." It professes to be composed of twenty-nine signs, to be extremely simple, and to have only four descriptions of signs, which represent thirty-two different sounds. Its distinctive principle, compared with Lucas's, is the phonetic one, the powers or vocal sounds of the letters rather than their name-sounds being taught, 'each word being embossed according to its actual pronunciation, the names of the characters combined, or sounded together, give the word." The 'Memoria Technica' which accompanies the lessons is most burdensome, and the twelve rules in verse for supplying the omitted vowels could never be regarded by blind or other readers who had to commit them to memory, in any light but as a distasteful task. We learn, however, that their employment is *optional*, though the system would be incomplete without them! The twelfth of these rules is:—

"Whene'er the proper rule don't yield you satisfaction,
On trial you will find the word is a contraction."

"A fair knowledge of the system may be acquired *by those who have sight* in three or four hours." Two things are noteworthy in this agreeable announcement. 1. That a system of stenographic reading can be acquired in three or four hours. 2. That stenographic systems require ordinary readers to learn them before they can assist their blind brethren in the acquisition of the art of reading.

The last system to be described is Moon's; although it is not stenographic in one sense, its characters have sufficiently the appearance of stenography to be taken as such; and again, although it claims to be the common alphabet simplified, it is certainly arbitrary enough for a first observer to recognise no similarity between it and the forms to which he has been accustomed. Mr. Moon, like Mr. Frere, is himself a blind man, and he has laboured hard to establish a system which he believes is destined to supersede all others. If all that he says in its favour could be taken for granted, no further question could arise as to the best alphabet for the blind. The judgment and experience of those who have means and opportunities for deciding, at least equal to Mr. Moon's, but whose zeal, enthusiasm, and interest are not fettered by partial views, do not bear out his statements.

"Moon's system is adapted to the cottage, *because anybody can teach it.*" This statement is more than questionable. Anybody of moderate intelligence can doubtless acquire it if they can already read. The same may be said of Alston's books, and herein consists their superiority—anyone who can read may at once be a teacher of reading to the blind. "It is adapted to the dull finger of the labourer, because it is *very plain to the touch.*" This is no exclusive advantage in Moon's letters. "It is suited to the aged, the sick, and the ignorant, because it is so *easy to be understood.*" This is a benefit compared with Lucas's and Frere's, but in this respect Alston's is certainly more deserving of praise. "The words are spelt at full length," and "full spelling is essential to accuracy." Granted, so are Alston's, which system does not employ even the few contractions Moon introduces; in this respect Moon's books are superior to Frere's or Lucas's, but inferior to Alston's. Moon's alphabet consists of "the *common letters simplified*, and therefore is easily learnt and taught by all who know their a b c." But, Alston's consists of the common letters themselves. We have doubts about the easy recognition of the transformed letters though none as to the increased tactile power of the new forms in comparison with the certainly more intricate forms of the ordinary alphabet. "Six of the Roman letters are retained *unaltered*; twelve others have parts left out so as to be left open to the touch, and yet be easily remembered as half of a well-known letter." Of these twelve none would be recognised from any similarity they bear to the letter they represent; they must therefore be regarded as arbitrary characters. "Five or six new and very simple forms complete the alphabet." These are arbitrary; so that this system of the "common letters simplified" is in fact composed of six of the Roman letters unaltered and eighteen arbitrary characters. Most certainly Moon's alphabet does not possess the superiorities over others to which it lays claim. That it is a *good* arbitrary character for the blind no one who has paid the least attention to the subject can deny. The question, however, has yet to be settled whether an arbitrary or an alphabetical character is the best for the blind. And on this point evidence must be adduced.



We find the schools for the blind in London, Glasgow, Newcastle, Manchester, and York, use the books in Alston's Roman characters; those of Bristol and Belfast also use these books, and in addition some printed at Bristol with lower-case letters as well as capitals. (Several of the parties competent to form a judgment on the matter, advocate the use of capitals.) We find Lucas's stenographic system in use at Bath, where the defective orthography is considered objectionable for young readers; the Roman alphabet has also been used in some cases; while for adults generally Moon's system is considered the best. At the Nottingham school, Lucas's system is generally adopted, some of the pupils also read Moon's books, and also those in the Roman characters. The schoolmaster, who is blind, reads on six systems, but gives a decided preference to Lucas's. The pupils read quite as rapidly as is necessary, and as correctly as others of the same age with sight. The superintendent of this school says "Lucas's books are less bulky than those in the Roman type and consequently cheaper." The statement received from Birmingham is similar to the above, "All the pupils read on Lucas's system, it is much liked by them, and preferred to any other; the value of a full orthography is understood, but the bulk and expense are considered objectionable. The Roman type is not generally considered readable." (Whether Alston's or the American Roman type is here referred to is not stated.) The Exeter school furnishes the following information. "Lucas's books are used here, and with but one or two exceptions, all have been able to read the scriptures. Our pupils have tried several systems. All of which they could learn, but they find Lucas's the easier to read." "The London Society for teaching the blind to read," situated in Avenue Road, Regent's Park, has become the head-quarters of Lucas's system. This society has published the whole of the Bible, which is sold in separate books or portions, the Liturgy, and several elementary works. The system has been revised and improved under the superintendence of the Rev. J. W. Gowring. Mr. Moon's printing establishment is at Brighton, but it has agencies at work in London, Birmingham, Edinburgh, and many other places for the introduction of the books. Moon's system has been well-received by the blind and extensively adopted; it is used in the schools of Brighton and Edinburgh. The testimony of Thomas Campbell in the name of the inmates of the asylum in the latter-mentioned city, speaks of Moon's books as superior to all others; his letter traces the efforts made in that asylum with respect to Gall's, Alston's, the American, and Lucas's systems, and his conclusions are entitled to consideration, for they are the results of experience strongly supported by facts which are adduced. He emphatically states "that Mr. Moon's system is not only the best ever devised, but that it is the only one capable of imparting lasting benefits to the working blind." In the various publications advocating the use of this system great stress is laid on its adaptability for the aged, the nervous, and the working blind—those generally in whom the sense of feeling is less than ordinarily acute. It is clear that as a system it can afford to stand on its own merits, and that its adherents need not depreciate other plans while they support its peculiar claims to public favour. This observation is made with reference to the disparaging remarks on other systems in Moon's 'Blind Readers and their Books.' Frere's publications are used in the Liverpool asylum; a society was also established at Blackheath some years ago for teaching the blind to read on Frere's system.

The price of these comparatively expensive books is a consideration which must not be lost sight of in any estimate of their respective claims on public notice. In another part of this article it is stated that a guinea was the sum proposed by Gall for a copy of the gospel of St. John; this, however, was the fancy price of an article new in itself, and for which there was no known market. All this is changed, as will be seen by a comparison of the prices annexed. The Gospel of St. John is now charged 4*s.* in Lucas's stenographic character; 4*s.* 6*d.* in Alston's Roman capitals: 8*s.* in Moon's arbitrary character. The book of Genesis is 8*s.* in Lucas's; 10*s.* in Alston's; 21*s.* in Moon's. The New Testament is charged 1*l.* 16*s.* in Lucas's; 2*l.* in Alston's; 4*l.* 17*s.* in Moon's. The Old Testament, 8*l.* 1*s.* 4*d.* in Lucas's; 7*l.* 15*s.* in Alston's; and 11*l.* 11*s.* in Moon's, without the books of Leviticus, Numbers, and 2 Chronicles; the addition of these will make the cost not less than 13*l.* 10*s.* This discrepancy in price is very great, and it is clear that Mr. Moon must reduce his prices to obtain that favour which he doubtless desires. How strange it is, however, that Alston's Old Testament in Roman capitals, without signs or contractions, can be had for less money than Lucas's with the aid of stenography and its very numerous contractions! Does stenography actually increase the bulk and expense of the books for the blind? The American books are much lower in price than any of the above: the letters are capitals and lower case, but so small that, in this country, they are considered unreadable by the blind. We have four systems in England, the Scriptures in each, besides many other books. And another character is projected. Mr. Littledale, himself blind, and the present superintendent of the school at York, proposes to bring out a "selected alphabet," made up of capitals and lower case letters, readable by any seeing instructor of a blind child; his strong impression being that the Roman character ought not to be set aside for one less universally known, and that no stenographic, or otherwise arbitrary alphabet, will meet the requirements of both children and adults for reading, writing, and accounts.

The writer of this article is not connected with any school for the blind; he does not wish to appear as a partisan of any system of typography for them, he has endeavoured to set forth the excellences and the defects of existing systems of printing, and to show the results as given by their respective advocates, while his wish is to see the superiority of a single system established, in order that the united efforts of all who are now engaged on methods so diverse may be combined for the production of good and cheap books for the blind. Enormous expenses have been incurred, chiefly by the benevolent public, in the purchase of the numerous founts of type, and in the establishment of several printing offices, where one would have sufficed if unanimity had prevailed. Each system has its adherents, but little good has been accomplished compared with such results as would have arisen from unity of purpose and willing co-operation. There cannot be a remunerating sale for the books produced on all the different systems. Zeal and benevolence may commence a good work of this nature, but it can only become an enduring benefit on the commercial principle. When this principle cannot be applied, zeal and benevolence will fail in providing heart-work and funds which must be so largely wasted. It may be a hard thing for men to sacrifice wishes long indulged and to forget objects for which they have lived and striven, but if the interests of the community, or of a class, require it, men of ardent and kindly feeling will not be backward in making such sacrifices. A conference should be held, partly composed of intelligent blind men, to ascertain whether it is possible to unite all parties in the prosecution of one system of printing, or whether all should persevere in a course which divides the friends of the blind and injures their cause. There are men living who have devoted years to the consideration of the question, and who would be glad to consider it by the lights of science and experience.

**BLIND, CENSUS OF THE.** In Great Britain and the islands of the British seas (exclusive of Ireland), there were 21,487 totally blind persons at the time of the last census—11,273 males and 10,214 females. Previous to 1851, no account had been taken of the number of the blind in Great Britain and Ireland, so that there are no means of ascertaining whether their number is increasing or decreasing relatively to the population. The numbers above given furnish a proportion of 1 in 975 in Great Britain, 1 in 979 in England and Wales, 1 in 960 in Scotland, and 1 in 837 in the Channel Islands and the Isle of Man. These proportions vary in different parts of the kingdom: in London the proportion is 1 in 1025, and it is nearly the same in the north midland, the south midland, the northern (including Yorkshire), and the south-eastern divisions of the kingdom; the west midland division presents us with 1 in 906; the eastern, 1 in 888; Wales, 1 in 847; and the south-western, 1 in 758: while the north-western district shows only 1 in 1167; the southern counties of Scotland, 1 in 1065; and the northern counties, 1 in 823.

On comparing these results with those obtained in other countries, we find that in the flat champaigns of Belgium, Hanover, portions of Saxony, Prussia, and some other German states, and the plains of Lombardy and Denmark, the proportion is 1 in 950; in the more elevated portions of Saxony, Prussia, Wurtemburg, Nassau, the duchies of Altenburg and Hesse, and also part of Brunswick, 1 in 1340; in Alpine regions, and countries elevated from 2000 to 8000 feet above the sea-level, as in some of the Swiss cantons, Sardinia, &c., 1 in 1500; while in Norway, according to the returns made in 1845, the proportion was 1 in 482. Thus the level portions of Europe present nearly the same results as Britain, while there are certain discrepancies in the above numbers which cannot at present be accounted for.

It has been thought that blindness has been increased by many of the employments followed in populous manufacturing towns; but it is clear, from the census returns, that a much larger proportion of blind persons is found in agricultural than in manufacturing and mining counties. For example, in Wilts, Dorset, Devon, Cornwall, and Somerset (south-western division), the average is 1 in 758; in Essex, Suffolk, and Norfolk, 1 in 888; and in the northern counties of Scotland, which include the Highlands, 1 in 823; while the highest proportion, namely, 1 in 665, is observed in Herefordshire. Contrasting these averages with the following manufacturing or mining counties, no unfavourable inference can be drawn as to the physical effects of manufactures on the sense of sight: in the West Riding of Yorkshire the blind are 1 in 1231; in Cheshire and Lancashire, 1 in 1167; in Durham, 1 in 1163; in Staffordshire, 1 in 1082. It should be remembered, that the asylums and schools which have been established for the reception and instruction of those deprived of sight are located in the principal cities and towns. Where, however, the towns are large, the number of inmates of these establishments only slightly affect the proportion which the blind bear to the general population. In London the proportion is 1 in 1025; in Manchester, 1 in 1107; in Liverpool, 1 in 999; in Birmingham, 1 in 1181. Conclusions unfavourable to the rural districts should not however be deduced from a mere comparison of the proportion of the blind to the population of all ages. Blindness is a common infirmity of old age; and an examination of the ages of the blind shows that nearly one-half of the persons deprived of sight are above 60 years of age. It follows, therefore, that in those localities in which the largest numbers of old men and women are living, the largest proportion of the blind will be found. In the great seats of manufacturing industry the population generally is much younger than in most of the agricultural counties where persons in large numbers, and especially females, are living, in circumstances favourable to longevity, at very advanced ages. Thus, in counties presenting the highest and lowest proportions of blind persons, the influence of age is sufficiently apparent. The proportion of population in Herefordshire aged 60 years and upwards is 10 per cent., while the proportion of blind of the same age is 61 per cent.. In Wilts, Dorset, Devon, Cornwall, and Somerset, the proportion aged 60 years and upwards on the whole population is 9 per cent.; on the blind it is 53 per cent. In Essex, Suffolk, and Norfolk, only 8 per cent of the whole population attain 60 years and upwards, while of the blind in the same locality, 50 per cent. attain this age. In the northern counties of Scotland, 9 per cent. of the population reach the advanced age specified; while of the blind, 54 per cent. attain the age of 60 and upwards. These four geographical divisions are those in which the highest proportion of blind persons is found. The four divisions in which the lowest proportions prevail present a very striking contrast with the above. In the West Riding of Yorkshire, the proportion per cent. of the population aged 60 years and upwards is only 6, while the proportion of the blind of the same age is 43 per cent. In Cheshire and Lancashire, the proportion on the whole population is 5, that of the blind 31 per cent. In Durham, the proportion on the population is 6 per cent.; on the blind, 52. In Staffordshire, the proportion of the population is 6 per cent., and of the blind 42.

In the early ages of life the numbers of the blind are not large. Of the 21,487 blind persons in Great Britain, only 2929, or less than 14 per cent., are under 20 years of age,—a circumstance tending to show that cases of blindness at birth are not common. Between 20 and 60 years of age there are 8456 persons, or about 39 per cent. of the whole number; while 10,102 persons, or 47 per cent., are at the advanced ages above 60. These facts point to the conclusion that blindness, in many cases, may have arisen as a natural infirmity attendant upon old age, and also show the great longevity of the blind, notwithstanding the accidents to which they are liable.

It is clearly shown in one of the tables comprised in the Registrar-General's returns, that this affliction is not confined chiefly to particular classes and trades, but exists amongst all ranks and in a great variety of employments. None of the great branches of manufacturing industry seem to be peculiarly liable to it; indeed, the small numbers returned against cotton, linen, silk, woollen cloth, iron, and earthenware, are remarkable when the immense amount of labour employed in these manufactures is considered. Factory workers are however mostly young persons, and none would be employed in the midst of machinery with any defect of vision. Amongst the items which present the largest numbers in the classification of employments, are (in Great Britain): agricultural labourers, 907; labourers not otherwise described, 512; Chelsea pensioners and soldiers, 586; Greenwich pensioners, 70; farmers, 505; domestic servants (chiefly females), 438; weavers, 295; coal-miners, 195; copper- and lead-miners, 68; stone and limestone quarriers, 51. Of the class described as "annuitants," and "living on alms," there are 1062; and 2833 blind paupers are returned in workhouses without any statement as to previous occupation. Of the blind following employments presumed to have been acquired after loss of sight, there are: musicians and teachers of music, 535; mat- sacking- and net-makers, 127, and knitters, 92. With respect to 2853 males and 5960 females, no returns as to their actual or previous pursuits are made.

Of the persons returned as blind in Great Britain, 11,273 are males and 10,214 females. Accidents and diseases resulting in loss of sight are more likely to arise in the employments followed by males than in those of females. The proportions in England and Wales are 113 males to 100 females; in Scotland the difference is slighter,—a result probably traceable to the preponderance of aged women in that country.

The Census Report of the Commissioners on 'The Status of Disease' in Ireland is one of the most valuable documents ever published in this kingdom on the amount and distribution of disease. The inquiry was conducted with much intelligence, and with such precautions as are not usually manifested in matters of this nature. As a *first* contribution on the permanent maladies to which the inhabitants of a country are liable, its importance can scarcely be over estimated, while it has opened a field for investigation which will hereafter prove a source of lasting benefit to science, and which cannot fail to be a means of directing attention to the afflicted classes whose position it exhibits.

According to the returns made to the Census Commission Office, there were 7587 persons (3588 males and 3999 females) totally deprived of sight resident in Ireland on the 30th March, 1851. Of this number, 1672 were in the civic and 4920 in the rural districts, the former localities including the different asylums and public institutions for the blind; and 995 persons (373 males and 622 females) were in the various workhouses and auxiliary workhouses at the time specified.

Without an accurate medical examination and special inquiry into the circumstances of each case, it would not be possible to define or tabulate the diseases or accidents which produced the large amount of blindness ascertained. How many were born blind there are no means of knowing: congenital cataract, the most frequent cause of blindness from birth, is not very common; loss of sight from purulent ophthalmia and ulceration of cornea is the most common; and in some districts, particularly in the west of Ireland, internal inflammations of the eyes of a rheumatic character prevail to a great extent, and are a frequent cause of blindness.

The limited space we can devote to this subject prevents us from giving the important Tables included in the Report, from which we have drawn the above facts and observations. To that Report all who are interested in the state of the blind in Ireland may be referred. We give the heads of these Tables.

Table I. shows the number of blind in the civic and rural districts and the workhouses, together with the proportion of males to females, and proportion to the population in the several provinces, counties, cities, and towns in Ireland.

Table II. shows by ages and sexes the number and previous or present occupations of the blind.

Table III. shows by ages and sexes the state of education and marriage among the blind in workhouses and in the civic and rural districts.

Table IV. shows the number, distribution, means of support, date of erection, and other circumstances relating to the various asylums for the blind in Ireland.

Table V. (taken from the reports of St. Mark's Ophthalmic Hospital, Dublin, from 1844 to 1852) shows the varieties of diseases and accidents of the eye in 11,233 instances, together with the colour of the eye in 7354 cases.

(Compiled and extracted from the *Official Returns of the Census of Great Britain in* 1851, published under the authority of the Registrar-General; and from *The Census of Ireland for* 1851,—*Report on the Status of Disease.*)

BLIND, EDUCATION OF THE. Blindness perhaps meets with more general sympathy than any other calamity. Our most beautiful and correct perceptions are derived through the medium of sight; the want therefore of such a medium is an evil for which no other possession can compensate. Hence it is that we at first consider the blind as an unfortunate race, whose conceptions must not only be confined to that narrow sphere in which they live and move, but, as far as a knowledge of external objects is concerned, must be limited to that imperfect acquaintance which is obtained by the sense of feeling. Looking however further into the subject, we find that the sense of hearing is constantly communicating knowledge to a blind person which helps him to analyse and compare; from which he draws inferences, and arrives at conclusions more or less correct; that constant experience enables him to modify any false impressions which he may have received; that association, memory, and other powers of the mind are active; that the senses of smell and taste are continually contributing some small additions to his stores of knowledge; and that, by these united means, he may become well-informed on subjects of ordinary discourse, though labouring under a disadvantage at first appearance insurmountable. The self-education of a child born blind commences as soon as that of one who sees; and if parents in such cases would give themselves trouble in its instruction, instead of looking upon their case as one of despair, they would be amply rewarded by the improvement, surpassing all expectation, which their child would make. They would find little difficulty in communicating to him the names, shapes, and many other particulars of objects; and indeed language, with the exception of some classes of words denoting colour, or other qualities which can only be known by means of sight, might be as perfectly conveyed to him as to the child possessing all its senses. They would find that they could give correct ideas of numbers to a large amount by means of tangible objects, and of still larger numbers by analogy; that they could also give ideas of time, space, distance; so as to impress him with correct notions of the earth, its size, inhabitants, productions, climates; the occupations, the pleasures, and the pains of mankind. All this is knowledge of a useful and pleasing kind, and many parents would become highly interested in such a work; they would soon find that they might proceed still farther, and enable their blind child either to attain a certain degree of perfection in some mechanical art, or, by educating his higher faculties, train him to occupy a more intellectual and important station.

The parent who reasons and acts thus upon his child's calamity, will be supported and animated by the knowledge that he is supplying by his own attention the defect of nature, and that he is educating his child to fulfil important duties with the same pleasure to himself that others have who possess a more perfect organisation, and that he is providing a most efficient check to listlessness and mental torpor.

The ear has been happily called "the vestibule of the soul," and the annals of the blind who have become illustrious confirm the remark, for they show that few intellectual studies are inaccessible to them. It has even been said, and has received a kind of universal assent among those who have associated much with them, that in certain branches of study they have a facility which others rarely possess. The blind appear to have immense advantages over the deaf; their intercourse with the outward world, by means of speech, is more direct, and consequently more rapid, and their knowledge of passing events is equal to that of mankind generally. The deaf and dumb *see* indeed all that passes within their immediate sphere; but owing to the circuitous mode of communication which they have to adopt, they can know little beyond it, and enter very partially into the spirit of passing events. In addition to this, finding that they do not always understand perfectly, nor guess rightly, their temper becomes impatient, and their countenance acquires an anxious or irritable expression, which is sometimes mistaken for cleverness. We know of no deaf persons who have attained to any great degree of eminence, even under circumstances favourable to the development of their powers; but with regard to the blind, they have enriched the arts, the sciences, and literature by their successful pursuits, and not unfrequently under circumstances of extraordinary difficulty. Viewing both these classes of men as devoid of education, dependent upon themselves for support, and for the enjoyment of life, the blind are *physically* greater objects of compassion than the deaf, because, without peculiar modes of education suited to their privation, they cannot obtain a livelihood; but so far as happiness is dependent upon knowledge, and from this source some of the purest enjoyments arise, they are nearly on a level with ordinary men. Through the ear they can acquire knowledge of the highest order, and cannot remain long in any company of their fellow-men without becoming in some degree wiser. The case of the deaf is the reverse of this; they are not *physically* so dependent as the blind: having the advantage of sight, they may apply themselves to and acquire the simpler imitative arts, and thus earn a subsistence, but *mentally* they are little above brutes; they can know nothing of the things around them, they feel themselves depressed and degraded among men; the language, the customs, the enjoyments of society, where these rise higher than what seems to exist among the more perfect animals, are to them unknown, and by them unregarded; and it requires only a small amount of reflection to perceive that an uneducated deaf person is not morally responsible for his conduct.

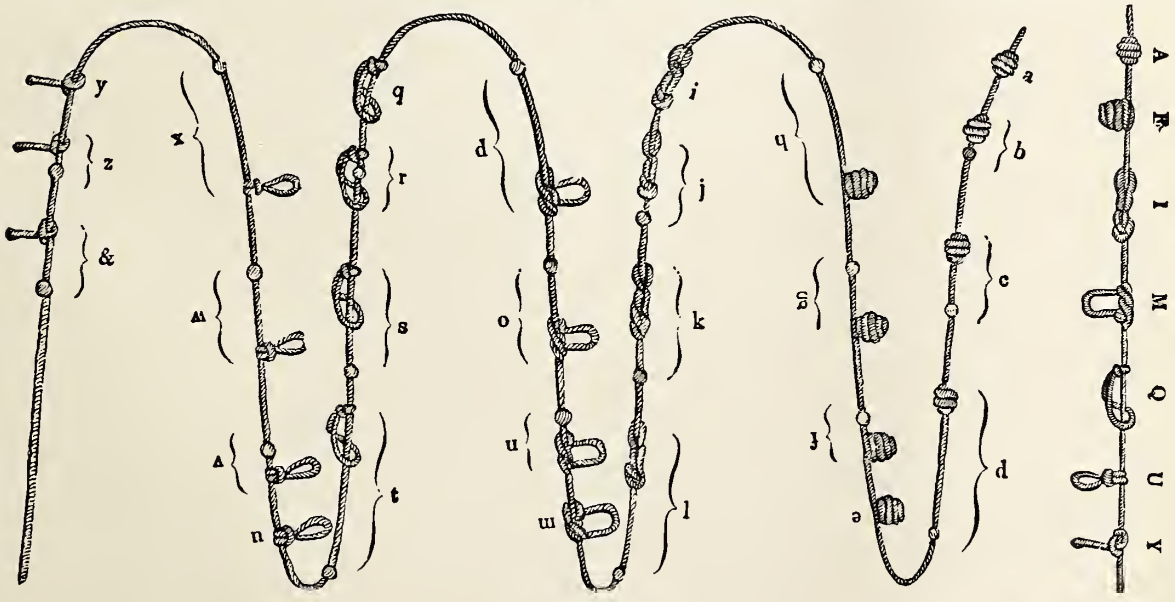
These remarks, and the comparison with which we have opened this subject, are not designed to show that the blind are less in need of education than the deaf and dumb; we are advocates for education in its fullest extent among all classes, but more particularly among persons who labour under impediments so distressing as those we have mentioned. Our advice would be to educate such persons as highly as possible, to improve especially those faculties which they appear to possess in a superior degree to mankind generally; but not to waste time and labour in endeavouring to instruct them in arts in which they can never attain to an equality with persons who possess the full enjoyment of their senses.

In this and in other countries, some attention has been paid to alleviate the sufferings and diminish the ignorance of the blind; the hand of kindness has been extended to lead them into society, and the voice of sympathy has been heard by them in the midst of their darkness. Asylums in several parts of Great Britain have rescued a few from a life of listlessness and anxious care, who have been instructed in various arts with the view of wholly or partially relieving them from dependence on their friends, their parishes, or the temporary bounty of the benevolent. To all who are entrusted with the charge of the pauper blind, and especially to boards of guardians, the words of Dr. Lettsom, the benevolent advocate of the charities for the indigent blind, may be addressed: "He who enables a blind person, without any excess of labour, to earn his own livelihood, does him more real service than if he had pensioned him for life."

It is invariably found that persons who are deficient in one sense exercise those that are left to them more constantly, and for this reason more accurately; for the senses are improved or educated by exercise. The exquisite fineness of touch and smell in the blind, the quickness in the eye of the deaf, the accuracy with which a seaman discovers a distant vessel long before it is discernible to the unaccustomed eye of a landsman, and the acuteness of sight, hearing, and smelling, in many savage tribes, are all to be referred to the same cause, namely, the constant exercise of those organs. Those persons who are deprived of one or other of their senses will, to a great degree, supply the deficiency by the aid of those which they still retain. Hearing and touch are especially cultivated by the blind; by the first they recognise speech, and the endless variations and modifications of sound; by the second they become acquainted with the external form of objects. The chief art of the instructor of the blind therefore consists in supplying through an indirect medium those ideas of which his pupil cannot obtain a conception through the ordinary channels; and in doing this he will act wisely to ascertain what ideas on kindred subjects his pupil possesses, whether such are true or false, and by what process he became possessed of them; to become, in fact, the pupil of his pupil; to draw forth the stock of knowledge already attained, in order to form a ground-work on which to proceed with his future instructions.

The mode which would probably first occur to a teacher in the intellectual education of the blind would be lessons delivered orally, illustrated by such analogies as would enable them to follow their teacher, taken, if necessary, from objects appealing to their senses. At first they would advance by slow degrees in comparison with pupils who see, but this very slowness would be accompanied by a sureness which would amply repay the pains taken to make the lessons understood. It is a fault in ordinary schools that the first steps are taken too rapidly, and one advance too quickly follows upon a former. Such schools might derive a useful lesson from the methods used in the instruction of those who are deprived of one or other of their senses. From oral instruction, the transition to a palpable language is natural. Accordingly, we find that the invention of *characters in relief* was among the earliest measures taken for instructing the blind. [BLIND, ALPHABETS FOR THE.]

An ingenious *string alphabet* was contrived a few years ago, by David Macbeath, a blind teacher in the Edinburgh School, in conjunction with Robert Milne, one of his blind companions. The following is their description of this invention: "The string alphabet is formed by so knotting a cord, that the protuberances made upon it may be qualified, by their shape, size, and situation, for signifying the elements of language. The letters of this alphabet are distributed into seven classes, which are distinguished by certain knots or other marks; each class comprehends four letters, except the last, which comprehends but two. The first, or A class, is distinguished by a large round knot; the second, or E class, by a knot projecting from the line; the third, or I class, by the series of links vulgarly called 'the drummer's plait;' the fourth, or M class, by a simple noose; the fifth, or Q class, by a noose with a line drawn through it; the sixth or U class, by a noose with a net-knot cast on it; and the seventh or Y class, by a twisted noose. The first letter of each class is denoted by the simple characteristic of its respective class; the second, by the characteristic and a common knot close to it; the third, by the characteristic and a common knot half an inch from it; and the fourth, by the characteristic and a common knot an inch from it. Thus, A is simply a large round knot; B is a large round knot with a common knot close to it; C is a large round knot with a common knot half an inch from it; and D is a large round knot with a common knot an inch from it, and so on." The alphabet above described is found by experience to answer completely the purpose for which it was invented. In the Glasgow Asylum, the greater part of the Gospel according to St. Mark, the 119th Psalm, and other passages of Scripture and history have been executed in this alphabet. The knotted string is wound round a vertical frame, which revolves, and passes from the reader as he proceeds.



The String Alphabet.

This alphabet reminds us of the *Quipos*, or knot-records of Peru, in which the history of their country was recorded long before the discovery of America by the Spaniards. Their *quipos* were formed of the intestines of animals, and there is a similar diversity in their symbols with that in the string-alphabet of which we are speaking. An account of these quipos was published in London in 1827. They were purchased by Alexander Strong for ten pounds, from a person who bought them at Buenos Ayres.

In further explanation of the string-alphabet the inventors say, "It must readily occur to every one that the employment of an alphabet composed in the manner which has been explained, will ever be necessarily tedious; but it should be borne in mind that there is no supposable system of tangible figures significant of thought, that is not more or less liable to the same objection. The inventors are aware that among the different methods by which people at a distance might be enabled to hold mutual intercourse through the medium of a language addressed to the touch, there are some that would doubtless be more expeditious than theirs; but they flatter themselves that, when all the advantages and disadvantages of each particular method are duly considered, the plan which they have been led to adopt will appear, upon the whole, decidedly the best. There can scarcely be any system of tangible signs, which it would be less difficult either to learn or to remember; since a person of ordinary intellect may easily acquire a thorough knowledge of the string-alphabet in an hour and retain it for ever. Yet the inventors can assure their readers that it is impossible for the pen or the press to convey ideas with greater precision. Besides the highly important properties of simplicity and accuracy which their scheme unites, and in which it has not been surpassed, it possesses various minor, nor yet inconsiderable advantages, in which it is presumed it cannot be equalled by anything of its kind. For example, its tactile representations of articulate sounds are easily portable—the materials of which they are constructed may always be procured at a trifling expense—and the apparatus necessary for their construction is extremely simple. In addition to the letters of the alphabet, there have been contrived arithmetical figures, which it is hoped will be of great utility, as the remembrance of numbers is often found peculiarly difficult. Palpable commas, semicolons, &c. have likewise been provided to be used, when judged requisite. The inventors have only to add, that sensible of the happy results of the invention to themselves, and commiserating the fate of their fellow-prisoners of darkness, they most earnestly recommend to all intrusted with the education of persons deprived of sight carefully to instruct them in the principles of orthography, as the blind being in general unable to spell is the chief obstacle to their deriving, from the new mode of signifying thought, the much-wanted benefit which it is designed to extend to their melancholy circumstances."

We entirely agree in the views here taken of the string-alphabet; as an auxiliary to the blind in the acquirement and application of language, and in the absence of a tangible writing on paper, we think no invention is superior to it, and we should be glad to have seen it in more common use among the blind in our recent inquiries at various institutions. The advice to instruct the blind carefully in spelling is important; for if this acquirement be not made, they cannot communicate by language with their fellow men otherwise than orally. To those blind persons who have lived together in institutions, and formed friendships which they wish to continue when separated by distance, the string-alphabet offers a mode of correspondence as perfect as our pen, one too which may be intrusted to ordinary persons to convey without any probability of the communication being deciphered.

David Macbeath, one of the inventors, was connected with the Edinburgh Asylum, as pupil and teacher, for twenty-five years. His inventions for teaching were numerous, and applicable to instruction in music, arithmetic, and mathematics. His string-alphabet was fully described in the 'Edinburgh Philosophical Journal,' some years ago. He conducted the public examinations of the Edinburgh pupils, where he never failed to excite the interest and attention of those present towards the objects of their solicitude.

In the infancy of the art of teaching the blind, *raised music* was invented, in order that they might be enabled to acquire their lessons independent of a master. This invention is at present little used, for the constant practice of those who pursue this branch of study is a continual exercise of the memory, and they are able to learn very long pieces by the ear alone. The reason assigned by Dr. Guillié for the disuse of embossed music is very satisfactory, "the scholar could not read with his fingers and perform at the same time." Thorough bass is however as readily studied by the blind as by the seeing, by means of "Tansure's Musical Board," described in his 'Musical Grammar.' This board is three feet long, about eight or nine inches wide, and has two staves, with ledger lines, above, between, and below. These are raised upon the surface of the board about one-sixteenth of an inch; the top of the stave lines being flat, while that of the ledger lines is round. It is pierced all over with little holes, so as to receive the pins, which represent the notes. We may here mention the invention of Don Jaime Isern, the object of which is to enable a blind composer to transfer his thoughts to paper in the usual musical notation, without the necessity of employing an amanuensis. For this invention the large silver medal of the London Society for the Encouragement of Arts, Manufactures, and Commerce was given to Don J. Isern in 1827. There is a full description of it, with illustrative engravings, in vol. xlv. of the 'Society's Transactions.' In the same volume there is an interesting communication on the subject of types for the blind, by Mr. G. Gibson of Birmingham. This communication is connected with various inventions which we have had the pleasure of inspecting, and of which we shall give a short account, referring our readers who desire to be made perfectly acquainted with the invention to the work above mentioned. Mr. Gibson's aim has been to supply the blind with a mode of writing and keeping their own accounts. "A cube of wood, or of any other convenient material, the size of which will depend on the delicacy of touch in each blind person, is to have raised on one side of it a letter, or figure, or stop, in the manner of a printer's type. On the opposite or lower side of the cube is a representation of the same character as is on the upper side, but formed of needle-points inserted into the wood. If therefore a piece of paper be laid on a cushion, or surface of felt, and the type be pressed down, the points will enter the paper, and form on the under surface of it a raised or embossed representation, by the projection of the burs where the points have penetrated, and this embossed character may be distinguished, and consequently read by the touch." In its outward appearance, the whole apparatus of Mr Gibson forms a small piece of cabinet furniture. When the top is thrown open an even surface of cushion presents itself. Upon this there is a flat piece of mahogany about an inch broad, which can be moved from one notch to another, to any part of the desk. This is for the letters to lie against, like the composing-stick of a printer. The letters he uses are a composition of tin and lead; the upper surface is elevated so that he can distinguish the letter, and the under surface has inserted in it needle-points of the shape of the letter on the upper surface. In writing the Lord's Prayer, after the paper is placed, he takes O out of its division, and puts it at the beginning of the line, then U, then R, gently pressing each letter down, as he puts it next the preceding one. At the end of a word he inserts a small mahogany space, and proceeds till his performance is complete; whether it be a copy of anything which he wishes to make, or an original piece of composition. It will be observed that, by putting two or more pieces of paper underneath his pointed types, copies will be multiplied. The letters are in small divisions, which occupy side-drawers in his printing cabinet. The use of this machine implies more knowledge than the uneducated blind possess, as they must know how to spell. However, it is a part of its object to teach spelling. For this communication to the London Society for the Encouragement of Arts, &c., Mr. Gibson was presented with the gold Vulcan medal of the Society. Another of Mr. Gibson's inventions may be here noticed. It forms a drawer of the cabinet above-mentioned, and is intended for working the rules of arithmetic. This Mr. G. calls his slate. It is divided into rows by elevated slips of wood, along which the figures are to slide. Like the types they are formed of metal, but have no needle-points underneath. We have seen him perform examples in multiplication and other rules by this apparatus, which is simply and beautifully conceived. It is obvious that all the elementary operations in arithmetic may be performed by it, and that by the union of this and the writing apparatus, a blind person may write his own letters, and keep his own accounts. We have dwelt upon the subject of reading and writing for the blind, feeling that they are deserving of all the importance which can be attached to them. Lieutenant Holman, the blind traveller, used Wedgwood's apparatus for writing in the dark. A very ingenious instrument of this nature has been invented by the late Mr. Hughes, who was for many years the governor of the School for the Blind at Manchester. We return to the early methods pursued in this art.

Embossed maps and globes for teaching geography would naturally be suggested to those persons who were engaged in teaching reading to the blind by raised figures. M. Weissembourg, a blind man of Mannheim, appears to have been the first person who made relief-maps; up to which time the instruction given to the blind on geography was merely oral. Various methods for producing maps of this character are now employed.

Palpable methods have also been adopted for making the blind acquainted with different branches of astronomical knowledge, and, in addition to raised maps of the heavens, various ingenious instruments have been contrived to further their progress in the science of astronomy. The application of such apparatus to the purposes of teaching has been attended with encouraging success. We shall detail some of the methods pursued in teaching arithmetic when we speak of the Edinburgh Institution, where the well-known invention of Dr. Saunderson has been so much improved that, by its means, any operation may be readily performed. For a description of the original invention, which was the united work of Dr. Moyes and Dr. Saunderson, we refer to the article 'Blind' in Rees's 'Cyclopædia,' or in the 'Encyclopædia Britannica.' By the improvements which we shall describe, it will be seen how greatly the simplicity of the contrivance has been increased. Previous to these tangible methods of teaching arithmetic the blind were instructed on this subject orally, the process on their part being entirely mental. A publication of late years, which is intended exclusively for the blind, is of a higher character and aim than any that have preceded it, though not one which will generally be considered as equal to many of these mentioned, in point of utility. The work to which we allude is an elementary treatise on mathematics by the Rev. William Taylor of York, called 'The Diagrams of Euclid's Elements of Geometry, arranged according to Simpson's edition in an embossed or tangible form, for the use of blind persons who wish to enter upon the study of that noble science,' York, 1828. As a means of leading to the acquisition of a science for which some blind persons have shown a predilection, this beautifully executed work is of great value, and we hope that the blind generally who show a superior aptitude for the exact sciences, even though instructed in a degree at the public expense, will have all the advantages which works like Mr Taylor's aided by good instructors can confer. It is stated that some of the pupils of the London School for the Indigent Blind worked a few problems for Mr. Taylor, their examiner, at their examination last Christmas.

Institutions of a philanthropic tendency have frequently originated with members, individual or collective, of learned societies; and such societies have lent their assistance and patronage to various efforts for advancing the condition of mankind, and removing the obstacles to improvement. The attempts of M. Haüy to systematise a plan for the education of the blind are the first which are deserving of especial notice. His methods were submitted to the Academy of Sciences of Paris, where they received all the encouragement he looked for. The commissioners chosen to report upon the means which he proposed to employ suggested to the Academy not only to bestow its approbation upon M. Haüy, but also to invite him to publish his methods, and to assure him of their readiness to receive from him an account of his future progress. It appears that many of the plans recommended by Haüy in his 'Essay on the Education of the Blind,' were not so much his own inventions as adaptations of the ingenious contrivances of individuals of different ages, and in different countries, who had preceded him in this benevolent work. The celebrity of certain blind individuals, partly the result perhaps of pains-taking teachers, and partly of their own highly gifted minds, had reached the ears of Haüy. By a happy exercise of benevolence and talent, aided by that enthusiasm without which the greatest labour is ineffectual, he formed the outline of a system of instruction, which required only time, and the modifications which discover themselves in every course of rational teaching, to be brought into successful operation. He wished to make the sense of touch do that for the blind which the Abbé de l'Epée had made the sense of sight do for the deaf and dumb. He wished to see the fingers of the blind employed in reading written language, and for this purpose he invented the noble art of printing in relief, which will hand down the name of Valentine Haüy with honour to posterity. Haüy offered to instruct gratuitously the blind children who were under the care of the Philanthropic Society. He commenced his instructions in 1784, and taught his pupils reading, writing, arithmetic, geography, composing types, and printing. In 1786 public exercises were performed by the pupils at Versailles, in the presence of the king; these exercises excited much astonishment, and there seemed to be little doubt of the stability and success of the undertaking. Large funds were subscribed, and the school was filled with pupils; but the commencement had been made on a scale too extensive for its regular maintenance, the warmth of popular feeling cooled, and as the institution was unsupported by government, Haüy never enjoyed the fruits for which he toiled. His school was not however suffered to fall entirely; it was taken up by the Constituent Assembly of the Revolution, and has since been supported at the expense of the government. The establishment of which we are speaking is the School for the Young Blind at Paris.

There are at Paris two celebrated institutions for the blind. The more ancient of these is the Hôpital Royale des Quinze Vingts, founded by St. Louis in 1260, for the reception of such of his soldiers as had lost their sight in the East. At its first establishment it consisted of *blind* and *seeing* persons, the latter being the conductors of the former. As its name indicates, it receives *fifteen score*, or three hundred blind persons. This noble asylum continues, as it was originally placed, under the government of the grand almoner of France. To obtain admission it is necessary that applicants be blind and indigent; they are admitted from all parts of the kingdom, are lodged in the hospital, and receive twenty-four sous (about a shilling) a day for their food and clothing. No instruction is afforded to the inmates of the Quinze Vingts; some of them, however, execute works, which, for their ingenuity, attract and deserve attention. The other Parisian establishment for the blind is the Institution Royale des Jeunes Aveugles, of which Haüy was the founder. It contains about a hundred young persons of both sexes, who are maintained and educated at the expense of the state for eight years. Paying pupils are also admitted. During the last quarter of a century the education of the blind has made great advances, as will be seen when the present state of the various establishments is compared with their actual condition, as described in the article BLIND of the 'Penny Cyclopædia.' The writer of that essay lamented that there was so much that appeared to him censurable, and that called for animadversion in the modes of education pursued in some of the schools for the blind. The article was, however, transmitted to three of these schools previous to its publication, and it was allowed to be a correct statement of facts. A great change for the better has since taken place, not only in the schools referred to, but in others also; new asylums have been established, and the attention of many experienced men has been directed to various branches of education, and especially to the provision of books in raised type, of which an account is given in the article BLIND, ALPHABETS FOR THE.

The first British Asylum for the Blind was established at Liverpool, in the year 1791. This institution has hitherto been liberally supported. During the year 1858, its expenditure was 3000*l.*, its income about 3400*l.*, derived from goods disposed of (the work of its inmates), from the payments made on behalf of the pupils, from legacies, donations, and subscriptions, from dividends, and the pew-rents of its chapel. The sums received for articles manufactured exceeded 900*l.*, but the produce of these labours does not assist the funds of the establishment. The instruction of the blind in manual labour seems to be the primary object with the directors of the institution. The trades which are taught are those of basket-making, rope-making, weaving, shoemaking, sewing, knitting and platting sash-line. The most profitable of these arts is the rope-making; the locality of the institution contributes to the advantages derived from this trade. The sugar-houses require so vast a supply of cordage, that it can scarcely be furnished in a sufficient quantity. The next most profitable labour is the weaving of carpets, lobby-cloths, and bear-rugs. Masters possessing sight are regularly employed in teaching the various trades; the reasons why the institution derives no pecuniary advantage from the extensive labours carried on are sufficiently obvious when the expense of experienced masters is considered, the waste of materials by the labourers who are chiefly learners, and their quitting the asylum when they can earn enough to maintain themselves.

The total number of persons who have been received into this asylum from its commencement to the publication of the report, January 1859, was 1429. Some very interesting details are given in the same document on the causes of the calamity under which the pupils labour, so far as could be ascertained by the officers of the institution.

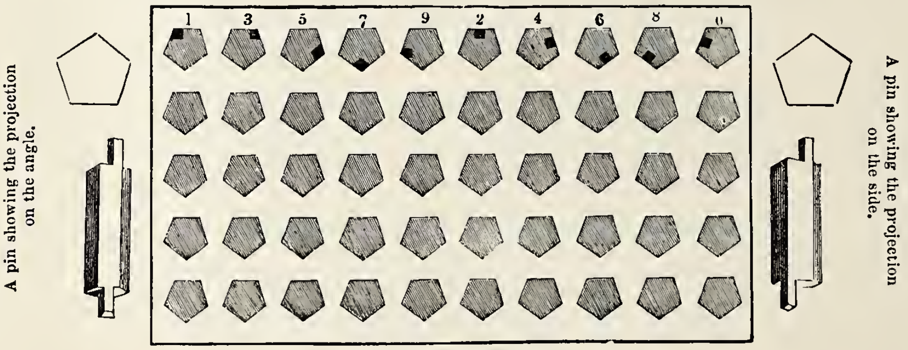
LIVERPOOL INSTITUTION, TOTAL NUMBER RECEIVED 1429.

| | Totally. | Partially. | Total. |
|---|---|---|---|
| Blind from their birth | 70 | 49 | 119 |
| " " small-pox | 202 | 48 | 250 |
| " " inflammation | 278 | 177 | 455 |
| " " cataract | 56 | 93 | 149 |
| " " external injury | 99 | 47 | 146 |
| " " defect in the optic nerve | 76 | 64 | 140 |
| " " amaurosis | 25 | 15 | 40 |
| " " imperfect organisation | 6 | 14 | 20 |
| Lost their sight at sea | 8 | 1 | 9 |
| " " by gradual decay | 5 | 3 | 8 |
| " " after fever | 14 | 5 | 19 |
| " " after measles | 8 | 5 | 13 |
| " " after convulsions | 3 | 3 | 6 |
| " " from causes not mentioned, or imperfectly described | 28 | 27 | 55 |
| | 878 | 551 | 1429 |

From the reports of the Liverpool Asylum, as well as from others which we have seen, the blind seem to be pretty equally scattered in all parts of the kingdom. Of the 1429 persons who have been inmates of the Liverpool Asylum, 225 have belonged to Liverpool, 294 to other parishes in Lancashire, and 910 to distant parts of the kingdom. A large proportion of the income of the institution is derived from Liverpool and its vicinity. The blind of that district have therefore a just priority of admission. There are 79 pupils in the Liverpool Asylum; 18 were admitted in 1858, and 21 left. Among those thus admitted, 8 are between fourteen and twenty, 4 are between twenty and thirty years old, 4 are upwards of thirty, and of 2 the ages are not specified. Most of those who have completed their education receive a gratuity of from two to five guineas when they quit the asylum, which sum is intended to assist them in procuring a few tools and materials for commencing the trades they may have been taught. This provision is both benevolent and wise; for there are numerous cases which come under the notice of the directors where poverty accompanies the deprivation of sight, and where, consequently, the instruction imparted would be of no practical benefit were not some means afforded of making it available to provide for their common necessities. The observances of religion appear to be regularly regarded: prayers are read in the chapel morning and evening, and the chaplain attends twice in each week to teach the catechism. The appointed hours for labour in the Liverpool Asylum are from six in the morning to six in the evening, one hour being allowed for breakfast and recreation, and another for dinner. Some of the pupils occupy a large portion of their time in the practice of music, singing, reading, &c. Frere's system of raised type is used, but the superintendent is not prepared to say which of the several series of books is most eligible for the blind. There are no fixed hours for acquiring the art of reading by touch, but instruction is given at such times as the teachers can spare from their other duties. Many of the inmates are middle-aged adults, whose object in entering the institution is expressly to acquire facility in some employment by which they can maintain themselves, and who leave as soon as they have succeeded in learning a trade, some of them only remaining under instruction from six to twelve months. This information has been supplied by the superintendent.

In the year 1793 an Asylum for the Blind was established in Edinburgh. The benevolent Dr. Blacklock, who resided in that city many years, had long anxiously wished that such an establishment should be formed for the education of those persons who, like himself, were deprived of sight. He mentioned his wishes to his friend Mr. David Miller, who was also blind, and was himself an eminent example of what might be effected under the influence of early and judicious instruction. In the year mentioned, it was determined by Mr. Miller and the Rev. Dr. David Johnston, of Leith, that an attempt should be made to provide an asylum, and means were taken to call public attention to the object. Mr. Miller communicated with the Abbé Haüy, and in many ways rendered important services during the infancy of the institution. The chief end in the formation of the contemplated asylum, next to imparting ordinary instruction (orally, it is presumed), and imbuing the minds of the objects with religious truth, was to place them under such superintendence as should train them in those trades in which the blind "are best fitted to excel;" at the same time rewarding them for their labours according to their progress and proficiency. In later years the directors of the asylum have extended their views, devoting increased attention to the intellectual culture of the pupils; but still the main object appears to be that of training them to habits of manual labour. The economical character of the Edinburgh Asylum must be a striking feature to all who compare its expenditure, considering the amount of good it accomplishes, with that of similar institutions. We have frequently heard of the excellent management of the public charities of Edinburgh; but in none is such management more visible than in this. In 1806 the directors formed a separate establishment for females, and since that time they have opened a school for the instruction of the young blind. It is by early training only that the blind, in common with others, can be brought under an effectual mental and moral discipline. By giving instruction to the young in the higher departments of knowledge, and by thus raising the intellectual character to the elevation of which it is capable, we are of opinion the directors will discover that the arts in which the blind are best fitted to excel are not the ordinary mechanical trades, to which, in our British institutions, and too generally abroad, all higher considerations have been sacrificed. Why are not their mental powers, which are unaffected by their physical calamity, cultivated? Such cultivation will qualify them for occupations in which they may succeed as well as those who possess the advantages of sight. The enlightened policy of the directors of the Edinburgh Institution has placed them in the first rank among the benefactors of the blind: their school for the young is a most interesting section of their establishment; and it may be hoped that many of its pupils will be trained to higher occupations than those of basket-making, weaving, &c. We do not anticipate that all the blind can be exempted from manual labour, any more than that all other men are fitted for employments requiring a high degree of intellectual vigour, and acquirements which even the greater portion of mankind are unable or unwilling to make: but we do not hesitate to affirm that the blind have been systematically trained in arts in which they never can enter into competition with seeing persons; and that they have not been sufficiently educated in that kind of knowledge in which they might have become at least as perfect as those who possess all their faculties. The former part of our proposition is allowed by the directors of the Edinburgh Asylum, who say that "when they (the blind) become as skilful workmen as their circumstances admit, they still labour under a disadvantage unknown to others." An argument which might with great propriety be used to enforce the advantage of mental cultivation in preference to manual dexterity, is the loss invariably attendant on the manufactures carried on at the asylums. It appears to us from our examination into the expenses of different establishments, that the more extensive the scale on which the manual arts are conducted, the greater the losses, from waste of materials, a succession of learners, &c. On the score of cheapness therefore it is desirable that such operations should be confined within as narrow limits as may seem prudent, and that intellectual education should be extended as widely as the talents and qualifications of the pupils will allow. Instead of the accounts of such institutions showing so great an amount of positive losses, we should not only see this item reduced, but find the pupils qualified for a sphere of usefulness superior to any which they can ever reach by any attainable degree of dexterity in manual occupations.

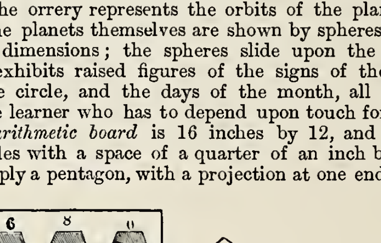
In the Edinburgh Asylum, the whole machinery seemed to be of a high order; the devoted attention of the different officers is visible in the discipline and happiness of the inmates, and there can be no doubt that the institution is effecting great good. The young blind are instructed in reciting the scriptures, in spelling, in grammar, in vocal and instrumental music, in reading, by means of the sense of feeling; in writing, arithmetic, mathematics, history, geography, and astronomy. The means by which instruction in these various branches is conveyed have been mentioned; in all institutions of this nature they must be generally the same, varying perhaps in some of their details. Several of the mechanical contrivances for conveying scientific knowledge to the pupils are the inventions of Mr. Johnston, the former secretary (nephew of Dr. Johnston, who was named as one of the founders of the institution), in conjunction with Professor Wallace, a gentleman who was deeply interested in all that concerned the institution. An orrery, a cometarium, and raised maps of the heavens, all so constructed as to convey information by the touch,—while the reasoning powers are at the same time addressed,—are among the inventions of these gentlemen. The map of the world is described as comprising "the eastern and western hemispheres, represented on each side of a circular board. The land is made rough, the seas, lakes, and rivers smooth. Towns are represented by small pins. Mountains are ridged, and boundaries simply raised. Degrees of latitude are marked round the edge of the circle, of longitude along the equator, which is raised above the surface of the earth. The orrery represents the orbits of the planets by brass circles, and the planets themselves are shown by spheres indicative of their relative dimensions; the spheres slide upon the brass orbits. The ecliptic exhibits raised figures of the signs of the zodiac, the degrees of the circle, and the days of the month, all tangible, and adapted to the learner who has to depend upon touch for his impressions. The *arithmetic board* is 16 inches by 12, and contains 400 pentagonal holes with a space of a quarter of an inch between each. The pin is simply a pentagon, with a projection at one end on an angle, and on the other end on the side. Being placed in the board, with a corner projection to the left upper corner of the board, it represents 1; proceeding to the right upper corner it is 3; the next corner in succession is 5; the next 7, and the last 9. In like manner the side projection, by being turned to the sides of the hole, progressively gives 2, 4, 6, 8, 0. The size of the pentagon, and a drawing of the pin, showing the projections on the side and angle, are given with the board above.


A pin showing the projection on the angle.
1
3
5
7
9
2
4
6
8
0
A pin showing the projection on the side.

The Arithmetic Board.

By the use of this board the pupils may be carried to any extent in arithmetical knowledge, and make their calculations with as much satisfaction as those who see. The last improvements in the Arithmetic Board were made by William Lang, at first an inmate of the Edinburgh Asylum, afterwards of that of Glasgow. Further to illustrate its use an example is given below of a sum in multiplication, which will be at once understood on comparing it with the board above; this example shows 259 × 4 = 1036. The pentagons represent the pins with their projections as supposed to be in the holes of the Arithmetic Board.

We have the testimony of Dr. Guillié, that the blind study the exact sciences under great advantages, and with remarkable success; but we cannot agree with the doctor that the blind, any more than *les clair-voyans* have a natural disposition for mathematical studies. The eminent success of Saunderson, Moyes, Gough, and others, afford sufficient proof that blindness is no great impediment to such pursuits; there may possibly be some advantages consequent on the degree of abstraction which appears necessarily to accompany blindness. On this supposition however we do not lay much stress, because we cannot admit that there is *naturally* any compensative principle by which men who labour under one defect or deprivation, are enabled to exercise the powers which are left to them with greater accuracy than others



who have no such deficiency. If a seeing person would cultivate his sense of feeling to the same extent as the blind, his perceptions of touch would be as delicate as those of the blind man. It is not probable that so refined a cultivation will ever be tested by experience, as it would require a greater degree of philosophical curiosity than we ever witnessed or heard of, and be attended with a longer and more painful effort than we think any one would voluntarily undergo for the sake of making the experiment.

The Bristol Asylum for the Blind owed its origin to the benevolent exertions of two members of the Society of Friends, Messrs. Bath and Fox. It was opened in 1793, in a disused Baptist meeting-house. After attempting several of the trades, basket-making was commenced, and although other occupations are followed, fine and coarse baskets have been the staple manufacture of this asylum to the present time. In 1803 its funds were so greatly increased that the committee of management were enabled to spend 1800*l.* on the purchase of premises in Lower Magdalen Lane, and its operations were there carried on till its removal in 1838 to the present eligible situation at the top of Park Street, where a building was erected in the early English style, with a chapel in architecture of a later character, and became a prominent ornament to the city. This building provides workshops for 100 pupils, and bedrooms for 70. At a subsequent date, rooms were added for washing, baths, and shower-baths, and a more recent purchase of land in Tyndall's Park gives ample room for exercise and amusement. If the utility of the asylum may be deduced from the progressive increment of the sales the conclusion will be satisfactory, as in 1794, its second year, their amount was 18*l.* 8*s.* 6*d.*, and in the year ending 1857 there was received "for baskets, table-mats, flower-stands, hearth-rugs, door-mats, and knitting, 1088*l.* 2*s.* 2*d.*"

The distribution of time in mental occupation and manual labour is as follows:—The pupils rise at 6 a.m., and work or take exercise till breakfast at 8 o'clock; at half-past 8 prayers are read by the master; the school-room is then occupied from 9 to 6, the classes being changed every hour. By this arrangement each pupil receives two hours' instruction daily. One hour in the day is allotted to musical practice, two hours' instruction being given to each pupil every week; the remaining time till 6 o'clock is occupied in manual labour, and, as occasion offers, the master or matron reads to the pupils while at work; but three days in the week they read collectively. On two evenings the pupils assemble for practice with the music-master, and the remaining evening they attend the chaplain for religious instruction. Supper is served at half-past 7; immediately after prayers are read by the matron, and the household retires to rest about 10.

Instruction in the Bristol Asylum is conducted by a chaplain; by the master, who teaches reading, arithmetic, geography, and history, and who has a blind assistant of either sex; by a music-master, with similar aid; by a basket-maker for the men, who has also two blind assistants; and by a female basket-maker, with one assistant possessed of sight and one who is blind. Great advantage is thought to be obtained by this employment of blind teachers, especially in the initiation of new pupils. The system of printing preferred in this asylum is that in the Roman character, by the late Mr. Alston of Glasgow. The books published by that gentleman were introduced in 1837, and have continued in daily use to the present time. A 'Life of James Watt,' an 'Elementary Geography,' 'Our Lord's Sermon on the Mount,' and a 'First Reading Book,' have been published at this institution in Roman capitals and lower case.

The report of the chaplain on the scriptural instruction of the pupils is very satisfactory. The report from which we quote states that nine of the younger ones had received confirmation, five of whom had become communicants. The master's report to the committee on their secular instruction is equally satisfactory: biography, history, arithmetic, grammar, and geography are the subjects of his statement; while the music-master considers the progress of some and the proficiency of others in music and singing as deserving commendation. All who are engaged in the management speak of the pupils as intelligent and well-disposed, and as manifesting a spirit of cheerful obedience. The welfare and conduct of the former pupils is not overlooked in the report of the committee: special instances are recorded of some of the advantages the asylum has conferred on individuals, and it is also stated that satisfactory accounts continue to be received from others, who, from the trades they learned and the industrial habits they acquired while at the asylum, are now earning a living in such a manner as not only to reflect credit upon themselves, but also on the institution. There are in the Bristol Asylum 66 pupils: males, 42; females, 24; upwards of 40 of them are under 20 years of age.

The School for the Indigent Blind in London was established in 1799 by four gentlemen of the metropolis,—Messrs. Ware, Bosanquet, Boddington, and Houlston. At first the pupils were few, and it did not attract any extraordinary share of public attention. About eleven years after its formation, the patronage of the public enabled the managers to take on lease a plot of freehold ground in St. George's Fields, opposite to the end of Great Surrey Street, where suitable buildings were erected, within which the institution is still carried on. An Act of Parliament was obtained in 1826, which invests the committee with all the rights and privileges of a corporation, and they then purchased the freehold of the ground on which the buildings had been erected. These buildings were found insufficient for the purposes of the establishment, and the committee purchased an adjoining plot of ground, upon which a new and enlarged building is erected. In 1800 there were only 15 persons in the asylum: the present number of inmates is 154,—78 males and 76 females. The inmates are "clothed, boarded, lodged, and instructed." The funds of the charity are ample. The receipts have seldom exceeded the expenditure. In addition to its annual subscriptions, donations, and legacies, it possesses a funded capital amounting to above 80,000*l.*, besides other available property. The articles manufactured by the females are, for sale, fine and coarse thread, window sash-line and clothes-line, fine basket-work, ladies' work-bags, and other ornamental works in knitting and netting; for consumption by the pupils, knitted stockings, household linen, and body linen. The occupations of the males are making shoes, hampers, wicker-baskets, cradles, rope-mats, fine mats, and rugs for hearths and carriages. These articles are sold at the institution, and it is said that the window sash-line is highly approved of by builders of the first eminence. The sale of articles manufactured during the year 1857 produced 815*l.*

An extraordinary change has taken place in the educational aspect of this establishment in the lapse of the last twenty-five years; its chief object at that time was instruction in manual labour; a few of the pupils were taught music, but the attempt to teach reading and writing had been abandoned from the unwillingness of the inmates to receive instruction. The recent reports contrast most favourably with those of former years. Not only are the pupils carefully instructed in the principles of the Christian religion, including the Holy Scriptures, and in vocal and instrumental music, but the following secular subjects are also well taught: namely, reading, writing from dictation, history, and geography; the emulating test of half-yearly examinations is also applied to this part of their education, and their inspectors in successive years (the Rev. J. D. Glennie and the Rev. W. Taylor) reported most favourably of the results. The former of these examiners says: "Both boys and girls are carefully and thoroughly instructed in the Holy Scriptures, Church Catechism, and Liturgy of our Church, and they have done justice to the instruction so received." In the boys' school, he was "much struck with the accuracy and rapidity with which the arithmetic, as far as Proportion and Practice, were performed." He congratulates the committee on the "efficient and satisfactory state of the school." The Rev. W. Taylor states that, "the first and second classes read steadily and carefully on Alston's system, showing that they did not read from memory, but made out the words as they occurred. The lesson on English history given by the schoolmistress was very satisfactory." The examiner of the boys' school, at Christmas last, reported favourably as to their proficiency in reading, religious knowledge, ciphering, embossed writing, English history, and geography; a small class also worked some problems in Euclid for him in very good style. The chaplain's classes, held on four days in the week for special religious instruction, comprise some not in daily attendance at the school, and exclude those who have not yet learned the Catechism.

The report states that "few of those who study music attain proficiency as readers or workers, and that great difficulty exists in procuring situations for blind organists. It is therefore most important that before making application for a pupil to receive musical instruction, his friends should well consider whether they have a fair chance for securing for that pupil employment as an organist or teacher of music. If a pupil becomes a good musician and is able to command employment, he may do well, but if from lack of talent, or other causes, he is unable to find employment as a musician, or to gain a living at a trade, he will probably become a burden to his friends."

During the year 1857, a novel and most important feature was introduced into the school, by the formation of a band of about forty instrumental performers, who are instructed in secular as well as sacred music. The band contains about an equal number of wind and stringed instruments, and during last year they gave a concert at the Hanover Square Rooms, which cleared upwards of 120*l.* for the charity, after all the heavy expenses were paid. The report states, "that though an attractive feature of the school, it is difficult to assign the band a higher office than that of supplying to the pupils a most pleasant and welcome recreation in their leisure hours."

One other feature in the operations of this school, derived from the example of a contemporary institution, demands especial notice from the writer of this article, with whom the idea originated, and by whom it has been carried out for many years at the institution with which he is connected, namely, an inquiry at certain intervals as to the after-life of the pupils. Such an inquiry can alone truly show the results of education; it is applicable to all schools, but more especially to those where children are boarded and educated for a series of years, and in whose future welfare, those who have directed their education, known their failings, and their better qualities, cannot but be interested. To all schools of poor-law unions it ought at once to be applied. The managers of the London School for the Blind, have sent out since the year 1854, about 150 forms of inquiry respecting pupils who have left school, and are now at work in the country. The inquiries embrace the following points: their present mode of gaining a livelihood; their average weekly earnings; their power of reading; their knowledge of music. and the use they make of it; and their moral character. The result of these inquiries is very satisfactory;

about ten only have not been answered; the pupils, with rare exceptions, possess good moral characters for steadiness, diligence, and Christian principle; for the most part these returns are attested by the minister of the parish. Most of them retain, to a greater or less degree, their power of reading, though many of them are greatly in want of books. Few are able, even with the utmost exertion to maintain themselves fully; but most of them are doing what they can, and only twelve receive parochial relief. Those able to do most towards their support are workers at baskets and mats, but the greatest difficulty prevails in finding employment for the musical pupils, many of whom having been educated for musicians, are unfitted for work of any other kind, and spend most of their time in idleness. The importance of the industrial work taught in the school is thus clearly established.

The Hospital and School for the Indigent Blind of Norwich was originally established in the year 1805, first for that city, and subsequently (as the condition of receiving a donation) for the county of Norfolk also; but its doors have been opened to other parts of the kingdom since the year 1819. The blind in the more elevated sphere of society appear not unfrequently to have been the first benefactors of their more indigent brethren. Mr. Tawell, a blind gentleman residing in Norwich, first called the attention of that city and its neighbourhood to the wants of the blind, and with a munificence commensurate with his zeal, he purchased "a large and commodious house, with an adjoining garden of three acres in extent," which he offered as the basis of the institution. The plan of the Norwich Asylum was to unite a school for the young with an hospital for the aged. It designed to admit the young pupils at the age of twelve years, and to keep them in the school till they should have attained a sufficient knowledge of some trade, as far as this could be accomplished within three years, but under no consideration to keep them longer than that time: some however have been kept longer. With respect to the aged, the rules express that none shall be admitted who have not attained the age of sixty-five years. It appears from the account of the institution published up to the end of 1833, that from the establishment of the institution to that date, 153 pupils had been admitted and 48 aged persons: 77 had been discharged qualified to work for themselves; 12 had proved incapable of instruction; 4 had left the asylum without leave, 13 had been discharged for irregularity, and 16 at their own request; 43 had died, and 36 remained on the books. The expenses seem to have averaged about 1100*l.* per annum, and the income about equalled the expenditure. (We can give no more recent account of the Norwich school, as no answer has been received to our inquiries.)

The Asylum for the Blind at Glasgow is pre-eminently a manufacturing establishment, although much attention is also given to the religious and secular education of its inmates. It was founded by John Leitch, Esq., of Glasgow, who was himself partially blind; he bequeathed 5000*l.* towards opening and maintaining the institution. Since the opening of the asylum in 1828 to the commencement of the present year (1859) 334 blind persons have been admitted; of this number 103 are now in the establishment. The manufactures carried on are of sacks and sacking, twine, baskets, mats, mattresses, and knitting. The sales in 1858 produced 5960*l.*, which was about 870*l.* less than the previous year, and the value of the manufactured materials on hand was 2024*l.* The revenue is chiefly derived from the sales, and in this respect the Glasgow asylum differs from every other in the kingdom. It solicits no annual subscriptions, but depends entirely for its support upon donations and legacies; this source is precarious, and sometimes, as during the past year, a deficit occurs. By the system pursued in this asylum the blind are placed, as nearly as circumstances allow, on a level with other workmen. Many of the adults reside with their families in the city, and go to their labour at the asylum like other artisans. The superintendent purchases the raw materials for the manufactures, and keeps an account of the work each person performs, from which a statement of their earnings is made, and they are paid every Saturday. The male adults are allowed the same rate that other workmen have for the same kinds of work; if a man can make five or six shillings a week, he receives that sum for his weekly wages. At the end of every four weeks a statement of his earnings is made up from the work-book, and whatever he has earned over that sum is paid to him, and also an additional shilling a week as a premium upon his industry. If the amount which he ought to earn be not earned, or the work be bad, no premium is allowed. At the monthly settlement some of them will have several shillings to receive in addition to their regular wages and premiums. Ever since the regulations regarding wages have been adopted, a marked improvement has taken place both in the quantity and quality of the work produced. The blind workmen and their families receive the fruits of their labour with much pleasure. A spirit of industry is excited and kept up very different to their former habits, and an opportunity is thus afforded them of enjoying the blessings of home, which could not be cultivated when they were maintained within the establishment. A few elderly females are placed upon the same system; they work in the institution, but reside at their own homes. Females generally, above the age of eighteen years, are admitted as day-workers; they dine at the asylum and receive regular weekly wages; their apartments are separated from those of the males, and no intercourse is permitted. Boys and girls from ten to sixteen years of age reside in the house, and in addition to attendance on their classes, they are taught to perform light works suitable to their age, till old enough to be removed into the regular workshops. The girls and female adults are under the superintendence of a matron, who also has the mangement of the sales. Several of the blind men are employed in calling on the customers of the asylum to deliver goods and to solicit orders. It is common for adults who reside in distant parts of the city to go to and from their employment without a guide, and no accident has ever happened to any of them. The usual branches of learning are taught to the young blind in the Glasgow asylum; the time devoted to school by both boys and girls is five hours a day on five days of the week, the chaplain being their teacher. The books used are printed in the Roman alphabet, which was arranged under the superintendence of John Alston, Esq., the former treasurer of the asylum, these books are printed on the premises, and are so numerous as to form a library in raised type. [BLIND, ALPHABETS FOR THE.]

There are three Asylums for the Blind in Dublin. The oldest of them, Simpson's Hospital, was opened in 1781; it was founded and endowed by a merchant whose name it bears, who was himself subject to a disorder of the eyes, and was also a martyr to the gout. The design of the hospital is to provide an asylum for blind and gouty men, the preference being given to those of good moral character, who have formerly been in affluent circumstances. About fifty persons partake of the benefits of this charity. It was incorporated in 1799, and its income is about 3000*l.* per annum.

The Richmond National Institution for the Indigent Industrious Blind is supported by subscriptions and donations; it was opened in 1809; the inmates, who are all indigent, are instructed in the trades ordinarily taught to the blind. At present the institution contains forty men and youths, who are lodged, maintained, and clothed there.

The Molineux Asylum is supported by subscriptions, by the profits of a chapel, and by charity sermons; it is solely for the reception of females, who are admitted at all ages. Those above fifty have here a permanent abode. The younger section of the establishment are lodged, clothed, and fed; and for a certain number of years receive instruction in those employments by which it is intended they shall earn their living. This asylum was opened in 1815, in the mansion of Sir Charles Molineux, Bart. This family has been among its most liberal benefactors.

In 1835, the Ulster Institution for the Deaf and Dumb, established at Belfast in 1831, admitted blind pupils also. This union of the two classes is a specialty in which this establishment does not stand quite alone. Between the two classes of inmates there is nothing in common, so far as their education is concerned; different senses being addressed, the process of instruction is essentially different, but when a medium of intercourse has been established between them by means of the manual alphabet, their being associated together is not without some points of interest.

On subjects of instruction the first place is given to religious training, and as a result of this, some of the blind pupils have become devoted and efficient city missionaries; one of them occupies an important position as one of the ministers at Brooklyn, New York. The other common branches of an English education also receive attention, and all who have voice and ear practise vocal music. About six hours daily are devoted to school, and two and a-half hours to manual labour. A large amount of the instructions conveyed is given orally, but the relief books printed at Glasgow, and those produced at Bristol are used by the pupils. Ninety-one deaf and dumb, and thirteen blind, are now in this institution.

The Limerick Asylum for Blind Females was established in 1835, chiefly through the instrumentality of the Dean of Waterford. It is capable of accommodating twenty inmates, but the funds of the institution do not afford support to this number.

The Yorkshire School for the Blind was instituted at York in memory of the late William Wilberforce. Its design is not so much to provide maintenance for the blind as to give them such instruction as may help them to gain a livelihood for themselves, attention being at the same time paid to their moral and religious instruction; their friends or parishes therefore contribute towards their support while they are in the institution. Those persons only are admissible who have lost their sight to such a degree as to be able at most only to distinguish light from darkness—those who have a capacity for instruction—those who are free from any dangerous or communicable disease—and those who have no vicious habits.

It is found from the recent reports of the Yorkshire school that less time is devoted to manual labour than in these asylums generally; but it must be remembered that the inmates are young. Music is much cultivated, and affords satisfactory evidence of its utility. With the view of forming a correct opinion on this subject, inquiries were instituted in 1856, as to the condition of the pupils who had left school. It was found that eleven had obtained situations as organists, and were enabled to maintain themselves fully; four others were engaged in teaching music and tuning instruments, and thus maintained themselves to a great extent. In addition to those who had left school, there were six male adults and one female still resident in the school, who were filling organists' situations. The results of these inquiries as to other industrial pursuits were less satisfactory, and the inference drawn was, that music was the only really remunerative pursuit for the blind, under the present arrangements of the Yorkshire School.

Another hint of considerable value may be drawn from the series of reports of the Yorkshire school. A year or two ago, a sergeant was engaged to drill the pupils, and it has been found of the most essential benefit to them. One of the pupils remarked, that he walked with much greater confidence since these exercises had been practised, and this feeling will be one of general experience; it may therefore be commended to the attention of other establishments for the blind. The superintendent of the Yorkshire school is W. D. Littledale, Esq., who is himself blind, and whose whole heart seems to be given to the improvement of the school. The general branches of education are taught, and books in the Roman type are preferred. The Rev. W. Taylor, author of the 'Tangible Euclid,' formerly devoted to the interests of this school, has left York; his attention, however, is still directed to the welfare of the blind. The number of pupils in the York school is sixty.

Henshaw's Blind Asylum, at Manchester, was opened for the admission of inmates in 1838. An endowment of 20,000*l.* was left in the year 1810 for the support of such an asylum, by the will of Thomas Henshaw, formerly of Oldham. Notwithstanding the large accumulations arising from this source, no part of Mr. Henshaw's bequest could be appropriated to the purchase of land for such asylum, nor for the erection of a suitable building; and the sum of 10,000*l.* was subscribed by the inhabitants of Manchester for these objects. The building, together with one in exact correspondence, for the education of the deaf and dumb, was erected at Old Trafford, and the approximation of the two charities was rendered closer by a subsequent agreement of the respective committees for the erection of a chapel in the space between the two buildings, thus connecting them as consistent parts of one uniform structure, in the English Academic style of architecture. The object of the asylum is not only to afford a home to the impotent and aged blind, but also "to maintain and afford such instruction to the indigent blind of both sexes capable of employment, as will enable them to provide, either wholly or in part, for their own subsistence, and to promote the employment of, or to employ, blind persons." The training of the inmates is therefore both intellectual and industrial, but it is not stated in the last report how the school instruction is carried on. It may be inferred that the books in Roman type are used; the late governor, Mr. Hughes, emphatically says, "I would discourage all systems of embossing which could not be read and taught by seeing persons." The articles manufactured are more various than in the generality of these asylums. The number of inmates in 1858 was seventy-five.

The Royal Victoria Asylum for the Blind, at Newcastle-upon-Tyne, was founded in the year 1838, to commemorate the coronation of Her Most Gracious Majesty the Queen; its object, as expressed in its first regulation, "being, to afford to the blind an elementary education, and instruction in those branches of trade and manufacture which shall be found suited to their capacity," as well as to afford them spiritual instruction. During the existence of the asylum, 115 pupils have been received into it, of whom 37 are now under its care, 22 of whom are males, and 15 females. Pupils are received into it from the four northern counties of England. The works of the inmates are of the usual kinds; the forenoon of each day is given to manual labour, the afternoon to music and general education. The relief books in Roman capitals are preferred.

The West of England Institution for the Blind was established at Exeter in 1839. It contains twenty-five inmates of the two sexes, all of whom are taught the usual branches of education, including music, and some to make baskets, mats, rugs, sash-line, &c. Sixty-two of its boarders and forty-one day pupils have quitted since its commencement. Its income is derived from the usual sources, namely, subscriptions, donations, board of pupils, and sale of work. Lucas's raised alphabet is used, and it is one of the regulations of the committee that "the system of teaching to read shall be that by means of the raised stenographic character."

An Institution for the Blind and Deaf and Dumb was formed at Bath about the year 1840. A considerable number of pupils of both these classes have been instructed under its care; and at the date of the last report (1858) it contained fifty-one boarders, of whom twenty-eight were deaf and dumb, twenty blind, and three partially blind and deaf and dumb; it also extends its benefits to day and sunday scholars, of whom it numbers twelve deaf and dumb, and four blind. Miss Elwin, of Bath, has taken a benevolent oversight of this establishment, from its first commencement to its present mature condition. A "Home" for blind girls has also been formed, for those who, having passed the allotted period of five years' instruction, have no friends able to provide them with a suitable place of residence. The training which the blind children receive is both intellectual and industrial; the former comprehends reading, on Lucas's system, arithmetic, geography, music, and singing; the latter is confined to basket-making. The morning hours are devoted to labour; the afternoon to mental and religious instruction. In the "Home," the greater part of the day is spent in basket-making, which contributes in part to the support of the establishment, and the inmates are frequently read to while they are at work.

An asylum for the young blind was established in Brighton in 1841, the pupils not to be under six, nor exceeding twelve years of age. It is designed for the town of Brighton and the diocese of Chichester, with power to the committee to receive candidates from other localities. This school is under the management of Mr. Moon, one of the inventors of raised characters, to whose system attention has been directed in the article, BLIND, ALPHABETS FOR THE. The school contains twenty-one pupils.

The Midland Institution for the Blind is situated at Nottingham, and comprehends the counties of Nottingham, Derby, Leicester, Lincoln, and Rutland. Its chief object is the education and training of the younger part of the blind community. The age of the inmates varies from nine to twenty-four. The usual intellectual and religious instruction is imparted, and the trades are much the same as those followed in other establishments; it is thought some new trades might be profitably commenced, and, among others, brush-making. No male pupils are allowed to commence work till they can read; but the female pupils, from the day of their admission, spend half the day in their work-room, to be instructed by the governess in sewing and knitting, and the other half in school. The teachers, except the governess, are all blind. Lucas's system of raised type is generally adopted, but some of the pupils can read Moon's and the Roman books. The schoolmaster, who is blind, reads books on six different systems, but gives the preference to that of Lucas. In arithmetic the pupils are considerably advanced, and can work and comprehend fractions and decimals; the arithmetical board and pegs differs from that used in the institutions of Scotland. The admission of day-pupils *free* on the recommendation of a governor is a good feature in this establishment, though it is not confined to it. Such pupils may remain as long as there is room for them; and when they have acquired a trade, so as to make articles sufficiently well for sale, they are employed and paid journeyman's wages.

The General Institution for the Blind, at Edgbaston, near Birmingham, was commenced in 1846 by private benevolence, and adopted by the public the following year. Its income is derived from the usual sources, namely, subscriptions, legacies, donations, payments on behalf of pupils, sale of work, &c. The present number of pupils is fifty-nine, and they are classified both for school and labour, so as to give all the advantages suitable for their age. The school teaching comprehends reading, spelling, arithmetic (peg and mental), geography with the aid of globes and maps, and object lessons. There are upwards of sixty maps, and one is used by every two pupils. These maps are made by friends of the superintendent, and have been much admired by the conductors of different institutions. In music the pupils practise from one to three hours a day, according to their progress and talent. Church music only is taught. Four of the pupils, from sixteen to eighteen years of age, have obtained situations as organists, at salaries varying from 20*l.* to 30*l.* a year. In reading by the touch, Moon's system is used. This institution has the advantage of an indefatigable treasurer, Thomas Goodman, Esq., whose exertions for this and other charities which have for their object the relief of human suffering, are beyond all praise.

The title of the next institution to be noticed would lead to the supposition that a new sphere of operations was to be brought under observation. It is called "The London Society for Teaching the Blind to Read." It is situated in Avenue Street, Regent's Park, and it has been in existence twenty years. The indications of its distinctiveness are few, and chiefly relate to its plan of admitting pupils, and its adhesion to Lucas's system of reading, in which it has published the whole of the Scriptures and many other works. The usual kinds of school-instruction and of labour are taught to the pupils, of whom there were sixty in the institution in 1858. As an auxiliary in the cause of the blind, it must prove beneficial. According to its rules, it receives free boarders on the nomination of donors of 250*l.* in one sum, and by election of subscribers for three years; indigent boarders on payment of 15*l.* per annum; music being an extra charge of two guineas per annum. Male adults are not lodged in the house, and have to pay 2*s.* a week for lodgings in the neighbourhood. Day-pupils are admitted free on the recommendation of a subscriber.

The establishments of which some account has been given are not the only means carried on in these days for alleviating the condition of the blind, and increasing their means of happiness. Other appliances are also in action. Although blindness cannot be considered as the heaviest of human calamities, it is one which claims the most immediate sympathy and prompts the universal desire for its relief. Societies have been established for teaching the adult blind to read; many of which are connected with Moon's system. Mr. Moon, himself blind, commenced his printing labours at Brighton more than ten years ago; his books are not only largely used in that place, but in many other provincial towns, which have been supplied with home teachers, and in which lending libraries have been established. One of these societies has been formed in London; from it have emanated two lending libraries of Moon's books; and its first report (1857) states that in eighteen months 236 blind pupils had, for longer or shorter periods, been under instruction; of these 117 had learned to read, of which number 53 were above 50 years of age, and 8 were from 70 to 75. It would be very ungracious to cast a shade of doubt on the statements put forth of the rapidity with which the art of reading was acquired by these aged persons through the medium of touch; yet there must be some fallacy, the facilities given by a previous knowledge of reading and spelling must have existed, for even aged persons with all their senses cannot learn to read *in three lessons!* If they could read and spell before they lost their sight, or if they had learned to read on some other system previously, the wonder ceases to some extent. The work is a good work, and requires nothing marvellous to sustain it. The London depository for the books on Moon's system is at 25, King William Street, Trafalgar Square.

In Euston Road, near St. Pancras Church, a thoroughly practical work is going forward for the amelioration of the condition of the industrious blind. It is known as "The Association for promoting the General Welfare" of this class of people. It has been in operation about five years; it provides means of industrial employment for those who have not been so fortunate as to obtain admission, and consequently instruction, in asylums; it supplements the education of those who have had this advantage; it teaches trades to those who have learned none, and finds a market for the work, thus enabling many of the adults so taught to support their families; it supplies regular work to many at their own homes; it finds workshops for others within the precincts of its own humble establishment. At present it affords employment to sixty-seven blind men and women, some of whom have been withdrawn from begging and destitution, and it has a list of upwards of ninety candidates, who desire to be put into a similar mode of earning their bread, and who will be gratified in their desire when the public favour to the establishment demands more articles than the present workers can supply. The town traveller and the porter of the establishment are both blind, yet they traverse crowded thoroughfares, and walk long distances, self-dependent, or trusting on the good-will of strangers for information and direction. Blind agents are also employed in selling the goods manufactured in several towns in different parts of the kingdom. This society is assisted by subscriptions and donations, for from the waste of materials and the slowness of the learners it cannot be self-supporting. The foundress of this truly beneficent association is Miss Gilbert, a daughter of the bishop of Chichester, herself blind, and a contributer of 2000*l.* to its endowment fund; for more than a year she worked the plan alone. Its control is now made over to a committee of influential men, and it may be hoped that the practical wisdom which devised its plans will be carried out with that ability which will ensure success commensurate with its object. The above account of this excellent charity is abridged from an article in 'Household Words.'

Charities for the blind also exist which grant annuities under certain conditions. The oldest of these is Hetherington's, it was established in 1774; the other is the Blind Man's Friend, established by Mr. Day; in October 1858 there were 2500 applicants waiting for this charity.

It appears that voluntary benevolence, together with the provision made under the Poor Law Act, by which the blind may be maintained during education in the asylums established, will in the course of time provide for the training in industrial pursuits of all the blind who require such aid. Great has been the progress towards this end during the last twenty-five years. The intellectual training will doubtless keep pace with the industrial, now that the public are aware how much can be done. The increase of books is also certain, with so many competitors for public favour in the field. It has been already stated that the Scriptures are published in four distinct systems. Attention should now be directed to the publication of a good reading-book on secular knowledge, the subjects of which should be consecutive, progressive, and systematic. The republication of some existing schoolbook is more desirable than the preparation of an original work for many reasons; but it should not be a miscellaneous collection of lessons without plan or arrangement on every variety of topic in succession, tending to bewilder and excite rather than to satisfy the mind. The moral tone of the inmates of the various schools is a subject of special mention in many of the accounts we have received, yet it is thought some advantages would arise from a stricter classification, so as to prevent the young blind from mingling with the adults and the aged. In the workshop the restraint which is necessary for the young is irksome to the older inmates, and the exercise of all their good principles is requisite to prevent the rising of a rebellious spirit. Separate establishments for children and adults, or an entire separation in the same building seems desirable. At Norwich there is such a provision. The inmates of Henshaw's asylum, at Manchester, are not restricted as to age, and are in for life, but the old are not separated from the young, consequently they cannot have that quietude which age and infirmity require. In one or two of the establishments drill and gymnastics receive attention. These physical exercises are highly commended by Dr. Blacklock, as giving confidence, and they should be universally cultivated among the young blind. It is a question worthy of some consideration by the managers of our asylums, as to what extent blind teachers can be eligibly employed in the various departments. As far as the communication and transmission of ideas are concerned, the blind teacher may possess some advantages over the seeing one, yet circumstances arise in which the evils attendant on the want of sight counterbalance these advantages. In the *schoolroom* we find bad habits and positions of the body; in the *workshop*, badly shaped articles and waste of materials; in the *musical department*, wrong positions of the hands, and a bad system of fingering, with an awkward attitude and distortion of the countenance in singing. It cannot be expected that blind teachers should be aware of these things. An exact record of the after-life of all the pupils should be kept in every asylum for the blind. Such records are the result of the care and attention of teachers, and of the application and attainments of pupils, and the blind themselves should know that such an account of their future course will be recorded, and published for the satisfaction of those who generously support these establishments for their benefit.

The number of blind men who have become eminent is large; for some account of them we must refer to the work of Dr. Guillié on the 'Instruction of the Blind,' to blind James Wilson's 'Biography of the Blind,' to the first volume of the 'Pursuit of Knowledge under Difficulties;' and to Dr. Kitto's 'Lost Senses—Blindness;' in these works we read of philosophers, mathematicians, divines, musicians, rhetoricians, lawyers, historians, poets, naturalists, road surveyors, mechanics, travellers, and even sculptors, who laboured under the infirmity of blindness.

The addition of deafness to blindness seems almost to shut out a human being from the external world. It is difficult to conceive how the mind of a deaf, dumb, and blind person can be occupied—much more difficult to say how it can be improved and educated. Yet there are many cases of this three-fold deprivation known, and there are always one or more such instances undergoing instruction in our blind or deaf and dumb institutions. The case of *James Mitchell*, the son of a Scotch clergyman, which was investigated by Dugald Stewart, Mr. Wardrop, and Dr. Spurzheim, is the best known; *Julia Brace*, a pupil in the asylum for the deaf and dumb at Hartford, Connecticut, is another instance of the same kind; *Victorine Morisseau*, a pupil in the Imperial Institution for the deaf and dumb of Paris, was another sufferer under this accumulated calamity; *Laura Bridgeman*, a pupil of Dr. Howe, in the Boston Asylum for the blind, is not only defective in these senses, but also in that of smell. She has had companions in the same affliction in *Oliver Caswell* and *Lucy Reed*. *Edward Meystre*, of Lausanne, is another case of the kind. He too has met with an instructor. Each of these instances is a history in itself of a mind sealed up, but unsealed by the indefatigable zeal and skill of their respective teachers. Space is not allowed us to go into the manifold processes which patience and enterprise invented for conquering the difficulties which interposed between these minds and the world without. The results are not merely satisfactory, they are marvellous.

The blind are not a moody or a discontented class—fun, frolic, and mischief are as inherent in them as in others. We extract a few anecdotes from an interesting pamphlet published some years back by Mr. Anderson, who passed many years of his life as teacher and superintendent in the several asylums of Edinburgh, York, and Manchester, which show their vivacious habits.

"Romping, jumping, laughing, and screaming, are as delightful to them as with boys and girls who see. The cross-bow, bow and arrow, trundling each other in a wheelbarrow, spinning tops, and to those who have a glimmer of light, called 'blinkers,' marbles, and a kind of cricket, all afford ample amusement, while there is no want of the usual boyish plotting and mischief. The girls also enjoy their play-hours very much, and contrive to stand in as much need of the needle as their more favoured sisters of sight.

"A girl at York took up a book lying beside me, turned up her face towards the gaslight above my head, and playfully observed, as she whirled over the leaves, 'Dear me, sir, what bad gas this is, I can't see to read a word by it!' The same girl standing near the fire, heard a companion trying to decipher some of the letters of the book in relief, 'Let me see,' said the latter, 'what's this—b i t, t e r; bit—what does that mean?' 'Sit a little nearer the light, my dear,' said her fireside companion, 'I know you don't see very well, Jane.' The tone of this indicated genuine playful mischief.

"A young man at the Edinburgh asylum, born blind, was at all times the essence of cheerfulness. He was one of our most correct 'messengers,' and a good collector of accounts, of which from the amount of our annual sales, we had many. He, as well as several others, could easily take from four to eight of these at a time. Coming along the passage whistling—he was always whistling—he began to grope about for his hat, which, not finding on its usual peg, he cried to a companion, whose foot he heard not far off, 'Willie, come here, man, and look for my hat, ye see better than me.' The one was as blind as the other.

"It is a remarkable fact that the blind scarcely ever hurt themselves, either against furniture, or in play. At Edinburgh they were constantly walking about the crowded streets. There were four or five 'messengers,' whose business it was to carry home all the goods sold—baskets, mattresses, rope-mats; and not only did they do this with the greatest exactness, but they were daily in the habit of going to all parts of the city, Leith, Portobello, and environs, to take measurements for bedding. I have many times had the dimensions of two, and even three beds brought to me—all on memory—with a precision not exceeded by the most expert workman, including the exact allowance of so many inches to be cut out for the bed-posts.

"I had occasion one evening, at Edinburgh, to send out one of these blind men with a mattress. I gave him the bill with it, that he might receive payment. He returned with the account and the mattress too. 'I've brought baith back, ye see, sir,' said he. 'How so?' 'Indeed, sir, I didna like t'leave't yonder, else I'm sure we wad ne'er see the siller—there's no a stick of furnitur' within the door!' 'How do you come to know that?' 'Oh, sir, twa taps on the floor wi' my stick soon tell't me that!' Having to send the same man to Portobello, toward evening, I warned him (rather inadvertently!) that if he did not make haste it would get dark. 'My word, sir,' said he laughing, 'I wish I had a shillin' for ilka time I've been in Portobello i' the dark.'

"As a body, the blind are the most habitually cheerful of mankind. How it comes to be so I cannot tell, and I have no wish to theorise. I cannot designate the blind, as is almost universally done, 'the unhappy,' 'melancholy,' 'pitiable,' and so on. I know nothing more erroneous, or more opposed to the feelings of by far the greater majority." So says Mr. Anderson in his 'Observations on the Employment, Education, and Habits of the Blind,' and he was a man of large experience among them.

BLINDAGE (called also BLIND), is a term employed in military art to any temporary construction made to secure artillery against the effects of ricochet and vertical fire, or the troops against the effects of shells; it consists usually of stout timbers, covered with fascines, earth, and sodwork, and in fact is the temporary expedient for casemates.

In fortresses, when regular casemates have not been constructed for the protection of the ammunition and provisions, or of the soldiers while not employed in active duty, covered buildings of a temporary nature are formed for those purposes at, or previously to, the commencement of a siege. The simplest are such as are made against the side of some strong wall within the place, or, which is preferable, against the revetment of the counterscarp, in a dry ditch, on any of the fronts not exposed to the fire of the enemy. These inclined blindages consist, when timber is plentiful, of thick beams placed close together, and leaning against the wall at an angle of 45°, one extremity of each resting on a sleeper laid in the ground: in other cases the beams are placed at intervals from each other; over them are laid horizontal joists close together, and the whole is covered to the required thickness with fascines and sods when they can be procured; the entrance is at one extremity of the building. This kind of blindage is also constructed to cover the miner employed in piercing the escarp wall of a rampart when the breach is to be formed in it by the explosion of a mine.

A blindage is sometimes formed independently of any wall, by planting the timbers in the ground in inclined positions so that their upper extremities meet together in a ridge, when the building resembles the roof of a house, and the whole is covered with fascines and sods. But generally an area is enclosed by a wall made of strong palisades planted vertically in the ground, the roof being formed of timbers disposed horizontally and close together, above which comes the bed of fascines and earth. For a small magazine the inclosing wall may consist merely of gabions filled with earth; the area being covered as before.

A blindage is said to be bomb-proof, when, from the thickness of its roof, it is capable of resisting the shock of loaded shells; and splinter proof when merely capable of securing persons within it against the fragments resulting from the explosion of such shells.

The French give the name of blindage to any building already existing in a fortress, when a shell-proof covering has been made to it in place of its proper roof; this cover is obtained by placing girders over the interior, and overlaying them with joists and earth. And when the walls are not sufficiently strong they should be cut down to a convenient height, and covered as before. On the exterior of the building leaning blindages may be formed as above described, and sometimes the whole of the exterior walls are protected in the same manner, leaving only the entrances, which are generally opposite to the piers between the doors and windows, where some of the inclined timbers are omitted: but occasionally the walls and roof are merely strengthened and supported by shoars or inclined props firmly fixed below in the ground, and above resting against and supporting the extremities of the girders. For these kind of blindages such buildings should be selected as have their lengths in the probable direction of the enemy's fire, to avoid as much as possible their being exposed to direct fire.

To secure some of the artillery on the ramparts of a fortress against the effects of ricochet and vertical fire, shell-proof blindages are formed, by planting in the earth strong palisades vertically six feet on each side of the gun, extending from the interior slope of the parapet about 24 feet to the rear, across the terreplein or upper surface of the rampart; these carry a roof made with timbers, which extending forwards covers the embrasure as far as 9 or 10 feet from its neck, or interior extremity. These blindages are open towards the rear, and the guns fire through the embrasures as usual. The under side of the timbers of the roof is about 7 feet above the terreplein, and is covered with a double layer of fascines and earth above that to a thickness of about 5 feet. It has also been recommended to form the blindage in the thickness of the parapet itself, the roof being well covered with timbers, fascines, and earth, open to the rear, but the exterior closed by a number of stout timbers placed horizontally, so as to make a wall 4 feet thick, through which the embrasures are cut, like the portholes of a ship.

In the attack of fortresses, when the trenches of the besiegers become subject to a plunging fire from the place, they are protected by blindages; these are formed by fixing rectangular frames of timber, commonly called great gallery frames [Mines], vertically along the two sides of the trench, and placing similar frames or any timbers across the trench on the top of these, to carry the roof which consists of fascines covered with earth or raw hides.

Blinded trenches of this kind were formerly much used by the besiegers to protect their descent into the ditches of fortified towns; one of this kind was executed by the French for that purpose when they besieged Danzig in 1813.

BLINDNESS. [Eye.]

BLISTER, a term used to express a bladder or vesicle raised upon the skin by the application of some external irritating substance, and also to denote the external application itself by which this effect is produced. The terms *vesicatory* and *epispastics* are also frequently given to the external application or other preparation. The substance usually employed as a vesicatory is the powder of the Spanish fly. [Cantharides.] The powder of the cantharides is mixed with lard and wax, so as to produce a plaster of tolerably firm consistence, which is spread on leather and applied to the part for the space generally of from ten to twelve hours. The first effect of the application of the blister-plaster to the external skin is to produce a sense of tingling and heat; this is followed by redness, commonly attended with pain, and subsequently there takes place an elevation of the cuticle into a vesicle or bladder, which contains a fluid resembling the serum of the blood. On the effusion of this fluid the redness continues for some time; the serum gradually thickens, and at last is changed into a whitish curdly substance, under which new cuticle is formed, though occasionally the serum is converted into proper purulent matter, the blistered part successively contracting, until the whole wound is healed. Sometimes coagulable lymph is effused.

The effect of the application of a blister is the production of a true inflammation over the whole surface of the skin with which the plaster is in contact. The effusion of a serous fluid from the excited capillary vessels of the skin is one of the ordinary phenomena of inflammation. The formation of the bladder or vesicle is occasioned simply by the elevation of the cuticle from the true skin, by the fluid poured out from the cutaneous capillary vessels. The inflammation induced by the blister is the effect of a powerful stimulus applied to the cutaneous blood-vessels and nerves.

The extent of the inflammation is usually confined to the surface in actual contact with the blister; it is comparatively rare that any degree of irritation is communicated to the general system; and yet the relief afforded is often so great, that the effect appears disproportioned to the cause, a small external inflammation mitigating or removing an extensive and severe internal inflammation. Much discussion has taken place as to the principle on which this relief is afforded, and the real mode in which the blister produces the benefit observed to result from it is not clearly understood. It is certain that the chief benefit results in the state of what is termed local inflammation; that is, when the inflammatory action is confined to a single organ or to a part of an organ. In order to understand the true nature of the change effected in the part relieved, it is obviously necessary to understand the true nature of inflammation. [Inflammation.] It may be here stated, that in inflammation artificially induced with a view of observing the phenomena that take place in this process, the blood-vessels of the part inflamed are seen to enlarge and to become preternaturally distended with blood, while the motion of the blood in such vessels is either very much retarded or ceases altogether. The knowledge of this fact enables us to understand, in some measure, the action of a blister. The application of a powerful stimulus, such as that caused by the Spanish fly, in the neighbourhood of vessels relaxed and over-distended with blood, relieves such vessels by depriving them of a portion of their blood, and by consequently removing the state of over-distention. For the stimulus applied to the skin determines a large quantity of blood to the cutaneous vessels under the influence of the vesicatory; this blood is derived from the blood-vessels of the parts in the immediate neighbourhood of the vesicated skin, from the blood-vessels of the inflamed part among the rest; and the blood-vessels of the inflamed part being relieved from the preternatural quantity of blood that distended them, return to their healthy action.

Another reason has also been assigned for the relief afforded by the application of blisters. It is observed, that when a morbid action exists in any part of the body, it may sometimes be removed by exciting a morbid action of a different kind in the same or in a neighbouring part. It is assumed that two morbid actions of different kinds cannot go on in the same part at the same time; hence the surgeon and physician, when they observe diseased action going on in a particular part of the body, induce, as near to that part as possible, another action of a different kind, frequently with the effect of lessening or altogether stopping the former morbid action. Now one of the instruments most commonly employed to excite this new action is the blister, and the excitement of such action, on the principle just stated, is conceived to be one mode in which the blister, as a general remedy, proves beneficial.

# THE BLIND.

CHAMBERS'S ENCYCLOPŒDIA.

No. 62.—Page 155.

PRINTED AND PUBLISHED BY W. & R. CHAMBERS,
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Algeria. The foundation-stone of the railway station was laid in 1859, in the presence of a large number of Arabs, who regarded the ceremony with intense interest.

**BLIGH, William**, an English admiral, born 1753, celebrated in connection with the mutiny of the *Bounty*. Having made a voyage round the world under Captain Cook, he was sent out, December 23, 1787, by the British government, as commander of the ship *Bounty*, to Tahiti, there to collect bread-fruit-tree plants, and thence sail with them to the West India colonies, where government was anxious to introduce them. The ship arrived at her destination in October of the following year, and in six months after was ready to sail for Jamaica, with 1015 plants on board. Partly on account of their demoralisation by their lengthened residence on so charming and productive an island, and partly owing to the harsh and tyrannical treatment they met with from their commander, a part of the crew mutinied, after they had been twenty-four days out, on the 28th April, and forced the captain and eighteen men into the ship's launch, which they cast adrift, turning their own course back to Tahiti, and ultimately settling on Pitcairn's Island (q. v.). The captain and his companions, who had very little provision, and no sextant or map, arrived, after almost incredible hardship, at the island of Timor, on the 14th June, a distance of 3600 nautical miles from the point where they were abandoned. To the skill and prudence of B., the fact that not a single life was lost, is chiefly to be attributed. On B.'s arrival in England, a man-of-war, under Captain Edwards, was sent, at his instance, to capture the mutineers. Some of them were seized; the rest had escaped to Pitcairn's Island, with Fletcher Christian, the leader of the mutiny. Their place of refuge, however, was not discovered until 1808, when an American ship accidentally touched at the island. At that time, drunkenness, debauchery, and unbridled passion had left only one of the mutineers, John Adams, remaining. Their fortunes here were made the subject of a poem by Byron, entitled *The Island; or Christian and his Comrades.* B. was again sent out to collect bread-fruit trees, and convey them to the West Indies, in which he was completely successful. In the French revolutionary war, B. commanded a ship of the line, but again exciting the disaffection of his men by his harshness, they mutinied, and ran the ship into a French harbour. In 1806, B. was appointed governor of New South Wales, but his conduct here was so tyrannical as to cause universal dissatisfaction; and in 1808, unable to tolerate his rule, the civil and military officers of the colony summarily terminated his government by arresting him. He died in 1817.

**BLI'GHIA.** See Akee.

**BLIGH ISLANDS**, that portion of the Feejee Archipelago originally discovered by Tasman, in 1643, which was seen by Captain Bligh of the *Bounty*, during his wonderful voyage in an open boat. The group lies in nearly 180° of long. and 15° 30′—19° 30′ S. lat.

**BLIGHT**, a diseased state of the cultivated grasses, especially of the cerealia. The term has been very vaguely and variously used, having, in fact, been applied to almost every disease of plants caused by the condition of the atmosphere, or of the soil, the attacks of insects, parasitic fungi, &c. It is frequently limited to the disease in wheat and other grains, which is also called Smut-balls, Bunt, Pepper Brand, or Stinking Rust, in which, while the grain retains its usual form and appearance, the interior of it is filled with a powder of a very fetid odour, consisting of balls so minute that it is calculated that four millions of them may exist in a single grain. These are a parasitic fungus, *Uredo caries* (*U. fœtida* of some botanists). See Smut.—The name B. has been frequently applied to diseases which seem to be caused by errors in the manuring of land, by which crops are often seriously injured. Unhealthy plants are most liable to be attacked by parasitic fungi, and by aphides and other insects, to which the origin of the evil has often been, in all probability, erroneously ascribed. Mr Berkeley, a high authority on such subjects, also states that 'there is a kind of B. sometimes very prevalent, which has been referred to fungi, but which is, in fact, nothing more than an excessive development of the epidermal cells, which are no longer kept within bounds by the real cuticle,' but become 'elongated and frequently branched in various ways, so as to form spongy or mealy patches, which are sometimes in such abundance as from their bright colour or peculiar aspect to attract general notice.' He adds that this is most common on woody plants, as vines and hawthorns, but that something analogous is to be seen on a few herbaceous species, 'a mere hypertrophy of the epidermal cells, or, indeed, mere fascicles of pubescence.' This kind of B., however, does comparatively littlo injury.

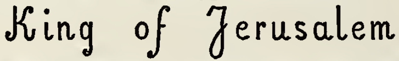
**BLIND, The**, those who are either partially or totally deprived of the sense of sight. Only a few are born blind, the greater number becoming so by accidents, small-pox, or diseases of the Eye (q. v.), so that more than one half are above the age of fifty. Blindness prevails most in tropical, and least in temperate countries; more in the eastern than the western hemisphere. There are about 30,000 in the British Isles. The balance between the outer and the inner world being disturbed, there is a tendency among the blind to self-consciousness, self-opinionativeness, and a desire to become the objects of attention, and, if possible, surprise, if not admiration; hence there is more avowed infidelity than in any other class, although probably much of it is assumed, to attract attention, and display their controversial powers. As these tendencies are not strong in individuals, but become intensified when they are congregated together, it is now generally admitted that the more they associate with the seeing, and the less with one another, the better.

The first institution for the blind was founded in Memmingen by Weef VI., in 1178; the second, in Paris, by St Luis, in 1260; the first for the employment of the adult blind was opened in Edinburgh by Dr Johnston, in 1793. There were in 1879 about 150 institutions for the blind in the world, two-thirds of which have only recently been established. Though the blind, in general, are more or less dependent, yet many have earned a comfortable living, and even attained distinction in departments generally supposed to be to them inaccessible. The employments most adapted to their abilities are the making of baskets, brushes, mattresses, rugs, and such-like; and for the women, sewing, knitting, and hair-plaiting. Many also have successfully competed with the seeing as musicians, music-teachers, and piano-tuners.

Printing for the Blind.—The first embossed book for the use of the blind was printed in Paris in 1784, by M. Valentine Houy, from flat movable letters, which his pupils had been previously taught to put together and read. Founts of types were cast and books printed; and having been approved by the Academy of Sciences, and exhibited before the royal family at Versailles, the art created at the time a great sensation. Large editions of a few volumes were printed at great expense; but as they were not easily read, and were used only for exhibition in the Paris Institution, the interest soon died away, and the greater part of the editions was long after sold for waste paper.

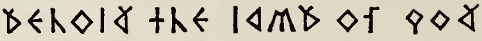
Printing can never be to the B. what it is to the seeing, and is chiefly of use for those gems of literature which can be read and re-read with interest. It is questionable, therefore, whether the art, after falling into abeyance for about forty years, would have been permanently revived, had it not been for the Bible, the book least wanted in Paris, but most wanted in Britain and America.

The merit of reviving it in this country is duc to Mr James Gall, of Edinburgh, who having in 1826 seen specimens of the Parisian books, and obtained a box of the types, was deeply impressed with the importance of putting the Bible into the hands of the blind, to employ their vacant hours. Being himself a printer and publisher, he at once saw the cause of the failure in France, and set himself to improve the alphabet, so as to make it more sensible to the touch. The following is a specimen of the Parisian type at that time:[*]



The principles which he laid down for his guidance were these: *First*, that the common alphabet (modified so as to be easily felt) is the only safe basis on which a literature for the blind can rest. He did not believe that any arbitrary character would be universally adopted or permanently adhered to; and as he looked forward to the blind being taught in common schools, not only to read, but to communicate with their seeing friends, he thought it indispensable that the books should be legible to all. *Second*, that the printing should be so large and legible that the adult blind should be able to read it *fluently*. It would have been easy to print books in a small type, which could be read by children only, and which, besides being much cheaper, would have astonished the public more; but he was of opinion that unless the adults were able to read easily, the books would not be read in private, and the object he had in view would not be attained. He also unhesitatingly preferred the common (low-case) alphabet to the capitals, which, though sufficiently well known, are not fitted for the use of the blind. Their symmetry and general uniformity, which specially adapt them for titles and inscriptions, render them unsuited for common and easy reading, either for the blind or those who see. They are even less adapted for the finger than the eye, because the eye can see the interior parts of the letters by which they are distinguished; whereas the finger can feel only the exterior form. Thus **E H K M N X Z** appear to the finger as a succession of squares, **O C G Q** as a succession of rouuds.

In 1827, after much study and many experiments, Mr Gall printed his 'First Book' for teaching the blind to read in a triangular modification of the common alphabet. The embossing was in high relief, and although it presented rather a rude appearance, being printed from wooden types, it excited great interest and wonder when it was found that the blind could read it easily with their fingers. This was followed by other little volumes, including a series of *Scripture Statements*, and a condensed *Epitome of Old Testament History*. These were received with so much favour, that in 1829 he issued a prospectus for the publication of the gospel by St John at one guinea, which was to pay not only for the copies, but preliminary expenses. This work was printed in 1832, but was not published till 1834; the delay being caused by the efforts of some zealous friends to induce him to adopt some arbitrary alphabet before printing the Bible, which, however, he firmly declined to do. The consequence was that, in 1832, the Scottish Society of Arts offered a gold medal, value £20, for the best alphabet for the blind; and this, although it increased the public interest in the newly revived art, had also the effect of paralysing Mr Gall's efforts, by preventing the public from giving him support until the result of the competition thus created had been ascertained. It would have greatly strengthened his hands if, as he hoped, they had awarded him the prize, for there was no other in the field; but after waiting two years, he could wait no longer, and in 1834,[*] he published his great work, *The Gospel by St John*, which was the first book of the Bible which had ever been printed for the blind in any language. This volume was printed in a type so large and legible, that some of those whom he had taught, were able at the public meetings to read any passage put before them through six plies of silk between the book and their fingers.



To make known the literature thus provided for the blind, Mr Gall visited England and Ireland, as well as different parts of Scotland, teaching the blind who were brought to him to read and write in a few lessons. The writing apparatus will be described hereafter. Letters thus written were transmitted by post, and as the same alphabet was used both inside and without, not only were the sealed contents read by the blind to whom they were sent, but the addresses also were read by the postmen who delivered them. Great interest began to be excited throughout Britain, and extended even to foreign countries. Abbé Carton was sent by the Belgian government to visit Mr Gall's establishment, and returned to set up a printing-press in Brussels which has continued to supply books for that kingdom. Dr Howe also, from Boston, visited Scotland, and having received from Mr Gall all the information which he could supply, established on his return to America a printing-press in the Perkins Institution. In 1834 he published the Acts of the Apostles, and completed the New Testament in 1836. About the same time, Mr Jacob Snider of Philadelphia, not knowing what had been done elsewhere, published the gospel by St Mark in 1834; but as he had unfortunately adopted the capital alphabet, his books could not compete with Dr Howe's; and after printing the gospels and a few other volumes his press ceased to be used. Dr Howe, on the contrary, had adopted an angular modification of the common alphabet, similar to, but much smaller than Mr Gall's, and with that printed the whole Bible, besides an ever-increasing number of other volumes in all departments, with which he contiuues to supply the whole of the United States. In Paris, also, the art was revived with great vigour, and a number of printing-presses were established in different parts of the continent.

Having thus succeeded so far as the blind were concerned, Mr Gall was next anxious to improve the printing and lessen the cost, so that any village printer could make it part of his ordinary trade, without requiring subscriptions from the public. By careful experiment, and with the help of his son, he was enabled to make the alphabet assume more of its usual form without losing its tangibility, and to enrich the sentences by the introduction of initial capitals for proper names, &c., as in common books. But the most important improvement consisted in the use of serrated types, by which the letters were formed of dots •••••• instead of lines. By this means the impression was not only sharper and more easily felt, but also more permanent, being better supported, as if by a series of arches, —∿∿∿∿— like corrugated zinc roofs. It was also found that when the paper was thus semi-punctured instead of being embossed, the common printing-press could print the sheets with half the pressure, and in half the time: and as the paper did not need to be nearly so thick as formerly, the books could be produced at one half of their former cost. In 1836, therefore, he offered to societies and publishers, to print books for the blind in the improved type at so much per sheet, as an ordinary business transaction, without either subscriptions or donations. Of this offer the London Sunday-School Union, the Religious Tract Society, and the British and Foreign Bible Society availed themselves in 1837; and in 1838 he printed for the British and Foreign Bible Society the gospel by Luke and the Acts of the Apostles (two of the eight volumes of the New Testament), which they were able to sell at 4*s.* each: and here ended Mr Gall's labours for the blind, extending over a period of twelve years, during eleven of which (1826—1837) he had been alone in the field.

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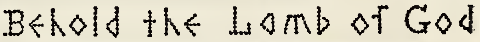
[*] In this, as in all the specimens which follow, the size is reduced to one quarter—that is to say, they are half the length, and half the breadth of the originals.

[*] The award was not made till 1837. Sixteen arbitrary alphabets had been sent in, all of which were rejected, and the prize was awarded to a Dr Fry, of London, who had suggested the use of Roman capitals, which, in 1834, had already been tried in America.

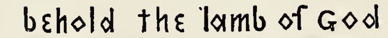
As the Institutions for the blind in those days 'had not hitherto (as they expressed it) patronised any device of this kind,' Mr Gall had to contend single-handed with all the apathy and incredulity which every new thing has to encounter. But now the tide had turned, readers were multiplying over the country, schools for the blind were beginning to be formed, the institutions abroad had all 'patronised the device,' and printing-presses were busy both in America and on the continent; so that when the Sunday-School Union, the London Tract Society, and the British and Foreign Bible Society began to publish class-books, tracts, and Bibles for the blind, they all at once became convinced of its importance, and took it up with so much energy, that there was now no longer any danger of its being abandoned; and as Mr Gall's work was thus practically accomplished, it was neither his interest nor his inclination to compete with them.

The first, and by far the most energetic, of the number was Mr John Alston of Glasgow, who, having established a printing-press in the Blind Asylum, of which he was treasurer, printed in 1837 the gospel by St Mark in the same type in which (unknown to him) it had been printed in 1834 by Mr Snider in Philadelphia. Through his influence it was at once adopted in the other institutions throughout the kingdom; and, having thrown himself with much enthusiasm into the work, he very soon raised funds by which he completed the New Testament in 1838, and the whole Bible in 1840. To him, therefore, belongs the honour of having printed the first complete Bible for the blind in any language, because Dr Howe of America, although he commenced the work earlier, did not finish it till 1842. The effect was immediate and decisive, rivalry was extinguished, hundreds of the blind were brought under instruction, and reading was thenceforth acknowledged to be a necessary department of the education for the blind.

If Mr Alston had adopted a modification of the low-case alphabet, and more especially, if he had printed his books in a much larger type, they would have been an unspeakable blessing to the blind in this country; because, not only would they have been universally adopted, but they would have continued to be used, and he would thus have prevented the lamentable confusion into which the printing for the blind in this country has fallen. But unfortunately, Mr Alston being encouraged by the decision of the Scottish Society of Arts, which he himself had very much helped to influence, fell into the double error of adopting the Roman capitals for his alphabet, and making his type too small. The consequence was, that a reaction very soon took place, the blind themselves being the first to rebel. The want of sufficient legibility was in their judgment a fatal objection, and outweighed all other considerations. Even the large amount of money that had been expended, and the extensive libraries that had been formed through Mr Alston's energetic labours, they were prepared to sacrifice, in order to obtain books which they could read with ease.



Gall's Serrated Type (*New Testament*, £1, 12*s.*)

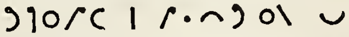


Howe's American Type (*New Testament*, 16*s.*)

BEHOLD THE LAMB OF GOD

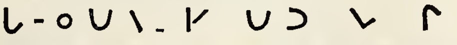
Alston's Glasgow Type (*New Testament*, £2.)

The second in the field, or rather simultaneously with Mr Alston, was Mr Lucas of the Bristol Institution, who invented a most ingenious system of stenographic printing with arbitrary characters and

* 

numberless contractions, by which he secured largeness of type and at the same time diminished the size of the books. He had in 1837 printed the gospel by St John, and in 1838 the Acts of the Apostles, but during the triumph and rapid multiplication of Mr Alston's books little attention was paid either to him or his system; but when the tide turned, and legibility became the great desideratum, the value of his invention became apparent, and in 1839 a society was formed to aid Mr Lucas in printing the Bible and teaching the blind to read upon his system. The blind were delighted with his books; his printing establishment was removed to London; large funds were collected; and the whole Bible and many other books were printed. (*Price of the New Testament*, £2.)

The third competitor was Mr Frere of London, whose objections to Mr Lucas's system were so strong, that he was induced to devise another,



which was (as he himself described it) 'a scientific representation of speech, the alphabet containing only one character for each of the simple sounds of the English language.' This opinion was shared by another large section of the friends of the blind; and accordingly, in 1839, another society was formed, another Bible was printed, another literature was created, and another illustration was supplied of the difficulty of securing the universal and permanent adoption of any arbitrary character for the blind. Mr Frere had also the merit of inventing the 'return lines'—that is to say, the lines in his books are read from left to right, and from right to left alternately, the letters themselves being reversed in the return lines. He also devised a cheap and very ingenious method of setting up and stereotyping his books, the letters being formed of small bits of bent wire laid on a tin plate, and fastened with heat. (*New Testament*, £2, 10*s*.)

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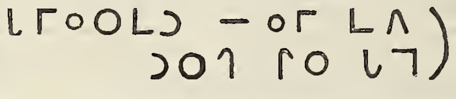
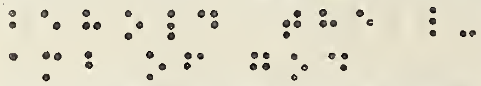
* In this, as well as in the specimens which follow the words are: 'BEHOLD THE LAMB OF GOD.'

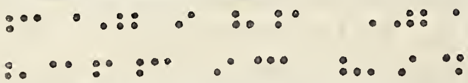
The fourth competitor was Dr Moon, of Brighton. He, too, uses an arbitrary alphabet, some of the characters resembling or suggesting the letters which they represent. He has also adopted Mr Frere's 'return lines,' but does not reverse the letters as Mr Frere does. Mr Moon's printing is larger than any other, and therefore more easily felt. This is a great advantage to beginners, and to those whose touch is very obtuse, although no doubt his books are on that account both bulky and expensive. Nevertheless, this is by far the safest side on which to err, and therefore Mr Moon's books are great favourites with the blind. A society, having numerous branches, has been formed to extend this system, and the blind are sought out and taught in their homes. Many more blind persons can read on Dr Moon's system than on any other. Besides the Bible, Dr Moon has printed (embossed) an extensive literature, both in English and in many foreign languages.



A fifth system has been recently imported from Paris, invented by M. Braille, which consists of the sixty-two varieties of form which six dots, ⠿, can be made to assume by the omission of one or more of them. This supplies not only the letters of the alphabet, but numerous other signs, of which he makes valuable use. There are two advantages which it possesses over all the others, and which it is supposed will cause it to supersede them. The first is, that it can be written easily by the blind themselves, by an apparatus to be afterwards described. The other is, that it affords the best method of writing and printing music for the blind which has yet been discovered.



A sixth system is an improvement on Braille, by Mr Wait of New York, which, it is confidently predicted, will supersede all the others. The signs, like M. Braille's, are produced by six dots, but they are placed horizontally, thus, ⠿

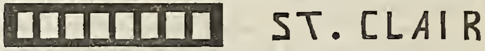


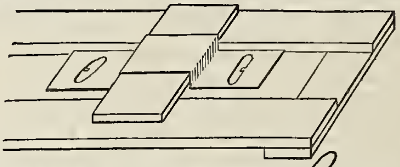
At present, it is impossible to predict the triumph of any of these systems, as their respective advocates are not only determined, but able to keep their ground. But as recent legislation has made provision for the education of the blind in common schools, where the influence of rival societies and extraordinary geniuses, who are not the best guides for their less talented brethren, will not be felt, it is not improbable that some common system will gradually come into general use. In the Report of the Royal Commissioners of the Exhibition of 1851, surprise is expressed that Mr Gall's labours should have been so summarily set aside, and they recommend now the universal adoption of Dr Howe's books.

Writing for the Blind.—This is of two kinds; first, writing to be read *by the blind*; and, second, writing by the blind, to be read *by the seeing*. Messrs Milne and M'Baine of the Edinburgh Asylum invented the 'string alphabet,' by which they were enabled to communicate with one another. The letters were represented by different kinds of knots tied upon a cord singly or combined. This was superseded in 1838 by Mr Gall's writing stamps, which, as they can be made to any pattern, have been much used. The paper is placed on a cushion frame, and a barred guide placed over it. The stamps are made of pins fixed in wood, and when pressed through thick writing-paper, produce a raised letter on the other side.

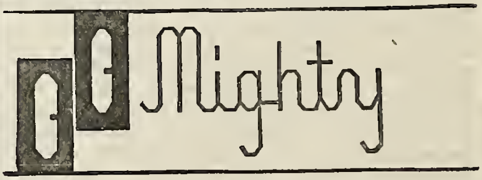
M. Braille's system of writing corresponds with his alphabet. Cartridge paper is placed over a grooved plate, with a guide having two rows of oblong holes. A blunt point forces the paper into the grooves, so as to produce the dots which form the letters on the other side. This is by far the most legible writing which has yet been provided for the blind, and is a strong recommendation of his alphabet for printing.

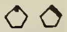
There are two methods of writing by the blind to be read by the seeing. The first is by Mr St Clair, a teacher of music in Edinburgh; the other is Mr Gall's Typhlograph. In both processes, the writing is produced by a hard pencil with a fine point, or by a blunt bodkin moving over carbonised paper, which deposits the blacking on the paper wherever it is pressed. Mr St Clair's guide consists of a line of small square holes, each of which represents a letter or a space. The steel point enters each hole, and makes a letter, guided by the four sides. Mr Gall's Typhlograph is a much more perfect instrument, and can be made to imitate any size or style of writing; but it is not so easily made.

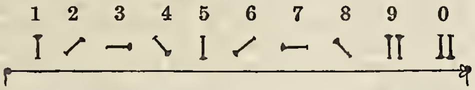




It consists of a hole of this shape, , cut in a thin brass guide, which slides freely between two wooden fillets, united at each end. The upper half of the hole is used when the guide leans against the lower fillet, and the lower half is used when the guide leans against the upper fillet. When the steel point has traced a line round the upper or lower half of the hole, it is stopped by the small projection in the middle of the right side—thus:



Arithmetic for the Blind.—There are three methods: 1. The *Parisian*. Embossed types are dropped into square holes in a perforated board, and read by the finger. 2. *Saunderson's*. Angular pins are dropped into angular holes, and indicate the figures according to their position. The pentagonal is the most convenient form, because one pin having the two ends  different can represent ten ciphers. 3. *Gall's* requires no apparatus at all, the ciphers being represented by common pins stuck into a quilted cushion or cloth of any kind, and the lines by twine stretched across—thus:



Although reading, writing, and tangible arithmetic are of great importance to the B., yet oral instruction is that upon which we must chiefly rely for their education. For that reason, the recent Education Act for Scotland, under which blind children may be educated in common schools, will be a great blessing to them.

**BLI'NDAGE.** When a besieged town has little or no bomb-proof shelter, screens are sometimes used called B., made of timber and earth; or of trees inclined towards each other, or placed in an inclined position against walls.

**BLIND COAL.** See ANTHRACITE.

**BLI'NDNESS** may arise from any cause intercepting the rays of light on their way to the optic nerve, or from disease of the optic nerve, or of that part of the brain connected with it. B. may vary in degree; it may exist from birth, or be the result of extreme old age. It may only be present during the day or the night, or a few weeks of the year, or it may be permanent.

*Congenital B.* is generally from some deficient development of the nervous apparatus, and is detected by the child being indifferent to light, and throwing its head from side to side. Occasionally, but very rarely, the power of vision is subsequently developed. Amaurosis has been already described.

Opacity of the vitreous humour, or of the crystalline lens—the latter is generally known as cataract—causes B., which comes on gradually. The patient with cataract can see best in the evening, or when the pupil is dilated, as then some rays of light are able to enter by the side of the opacity. The B. from cataract is seldom so complete as to prevent the person from distinguishing day from night, or from being aware of opaque bodies passing between him and the light (see CATARACT). Opacities of the cornea, if extensive, or in the axis of vision, produce some degree of B., whether they are on or in its substance. In general, these are irremediable; but if there is a spot, an artificial pupil may be made. Some years ago, Mr Bowman, of London, met with a case in which the opacity consisted of a layer of phosphate and carbonate of lime: he removed it, and restored the vision, which had been totally lost for several years.

*Night B.* is a rare condition, in which a person finds, towards evening, that objects are becoming less and less distinct, and at last that he is totally blind. This may occur without previous warning, and cause great alarm, but next morning he finds that his sight is restored. This is repeated every night, but at last the eyes become weak during the day also, and may finally become amaurotic. This strange affection may be epidemic; it has attacked bodies of troops exposed to great fatigues and the glare of the sun's rays. If there are no symptoms of disease within the brain, recovery generally results from protecting the eyes from the light, entire repose, such remedies as correct any constitutional defect in the individual attacked, and repeated blistering.

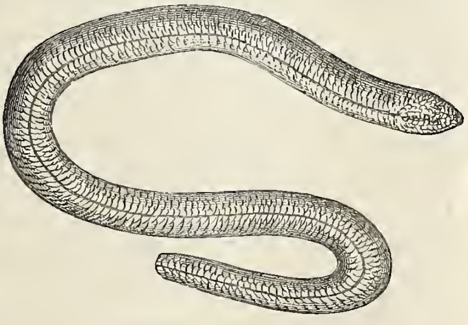
*Day B.* is characterised by inability to see in a bright light; the subjects of it see more than usually well at night, but during the day have to be led about. Captives who have been long immured in dark cells are often affected with it, as a galley-slave mentioned by Larrey, who had for thirty-three years been shut up in a subterraneous dungeon, and when liberated could only see by night.

The structural causes of B. will be better understood when the eye (q. v.) is described, when it will be seen that advances in our knowledge of its anatomy have enabled surgeons to restore sight in cases which, some years ago, would have been considered hopeless; but it can never be too strongly impressed, especially on the young, that overwork wears out the eyes, whatever be the pursuit, and that, without being wholly dark, a degree of blindness may be induced, such as to render the eyes useless for practical purposes. This condition, asthenopia or weak sight, is frequently met with in young lads with sedentary occupations, students, dressmakers; and, says Dr Mackenzie of Glasgow, 'what may be called the hot-house education of modern times is a fruitful source of it.' The only cure is avoiding the evident causes.

**BLI'NDNESS, COLOUR.** See COLOUR BLINDNESS.

**BLI'NDSTORY,** another name for the *triforium* (q. v.), the second or middle arcade in the wall which separates the body from the aisles of a church. It is so called obviously as opposed to the *clearstory* or *clerestory* (q. v.), the third and uppermost arcade, the apertures of which admitted light into the church, while the apertures of the triforium were dark—*obscuræ fenestræ*, as they are termed by Gervase of Canterbury. The B., which is most common in cathedral, conventual, and collegiate churches, served to give access to the various parts of the building, and to suspend tapestry and banners on high holidays. Viewed æsthetically, the gloom of the B. contrasts well with the lustre of the clerestory.

**BLI'NDWORM** (*Anguis fragilis*), a small reptile, which, although it has commonly been ranked among serpents by naturalists, in consequence of agreement in general form, exhibits remarkable points of difference from the true serpents, and constitutes one of an interesting series of links by which they are connected with lizards. Mr Gray has therefore recently united this, and other nearly allied genera, with the Scink and Seps family of saurian reptiles under the name of *Saurophidia* (Lizard-serpents), amongst which the gradation from the lizard to the serpent structure is marked by the more and more complete disappearance of limbs, and the increasing elongation of the body. In the genus *Anguis* there is no trace of limbs externally, but the bones of the shoulder, the sternum or breast-bone, and the pelvis still exist in a rudimentary condition: the bones of the head, also, connect it with lizards, and do not


Blindworm (*Anguis fragilis*).

admit of that dilatation of the gape which characterises true serpents. The common B. is the only species of this genus known in Britain. It is found also in almost all parts of Europe. In some districts of Britain it is plentiful; in others, it is very rare or even unknown. It is a perfectly inoffensive creature, although it has very generally been persecuted by the ignorant as extremely venomous. Its teeth are so small that even when it attempts to bite, which it only does upon much irritation, it cannot pierce the skin. No species of the group to which it belongs has poison-fangs. It is very timid, and when alarmed, contracts itself forcibly, and then becomes remarkably brittle, so as to be easily broken in two by a blow or by an attempt to bend it. This character of fragility is found also in other animals of this group. The name B. has apparently originated in a mistake caused by the smallness of the eyes, which, however, are very quick and brilliant. Another common name, *Slow-worm*, is more accurately characteristic. The length varies from 11 to 15 inches, and sometimes even exceeds this; the thickness is almost equal throughout, the tail is blunt at the end; the scales are small, and nearly equal; the tongue is notched at the extremity, but not bifid as in snakes; the colour is generally silvery gray, a dark line runs along the back, and frequently rows of dark spots along the sides. The food of the B. consists of slugs and insects. It retires in autumn under masses of decayed wood and leaves, or into soft dry soil. It changes its skin. It is viviparous (ovoviviparous), the number of young varying from 7 to 12 or 13 at a birth. The name B. is sometimes given to *Cœcilia* (q. v.).

**BLI'STERED or BLISTER STEEL.** This is the kind of steel from which, by hammering, rolling, &c., certain qualities of tools and files are fashioned. When broken up, piled, and welded under the hammer, it forms *shear steel* (see IRON), from which a finer class of tools is made, and when melted in crucibles it forms the finest kind of *cast steel* (q. v.) for cutlery. Blister steel is made from bar iron of superior quality by a process of *cementation;* and the furnace employed for the purpose is termed a converting furnace. It consists of two fire-brick rectangular chests or troughs, each being sixteen feet long and three feet deep by three feet wide, as a maximum size, placed alongside each other in an arched chamber, and surmounted by a wide conical chimney. One long fire-place, with a suitable arrangement of flues, heats both chests. Into each chest the iron bars are laid embedded in charcoal, about half an inch of which intervenes between each layer of iron bars. The whole is then plastered over with clay or grindstone-dust, and kept at a glowing red heat from seven to ten days, according to the purpose for which the blister steel is intended. When the bars are removed after cooling, they are found to have undergone a remarkable change They are no longer tough, but quite brittle and fusible, and covered over with blisters. During the process, the iron absorbs and combines with from a half to one and a half per cent. of carbon. The blisters are supposed to be due to the evolution of carbonic oxide arising from the combination of carbon with a trace of oxygen existing in the iron.

**BLI'STERING FLIES.** See CANTHARIDES.

**BLI'STERS** are medicinal agents which, when applied to the skin, raise the cuticle into small vesicles filled with serous fluid. They are applied either in the form of plasters or in a fluid state, as suits the convenience of the person or part, and have for their object the establishing of a counter-irritation or diversion of inflammatory action from a part in which it cannot be reached by remedies, or from some organ where it may do permanent mischief, to some more superficial part of the body.

The most common blister in use is made of cantharides (q. v.) or Spanish fly (*Cantharis vesicatoria*). Cantharides, mixed with a convenient proportion of lard and wax, form the blistering ointment of ordinary use; the only objection to this preparation being, that if applied too long it produces distressing affections of the urinary bladder. In young children and very thin-skinned persons, a layer of silver paper, or thin gauze wet with vinegar, may be laid between the blister and the skin. But under no circumstances should a blister be left long upon children, as it may produce sores which are apt to take on an unhealthy action, and are difficult to heal.

Mustard (*Sinapis nigra*) is frequently used, but seldom left on sufficiently long to produce blistering. Tincture of cantharides, croton oil, and strong liquor ammoniæ, tartar emetic ointment, and many others are used in practice.

If the occasion for the blister passes off, the vesicles should be pricked, and their fluid contents allowed to trickle away, the vesicated surface being then dressed with some cold cream or lard. But if it should appear desirable to promote a discharge from the skin, the raised cuticles may be snipped off, and the blister either applied again at intervals, or some stimulating ointment as the savine (*Juniperus sabina*) made use of. Great cleanliness should be observed in dressing the part.

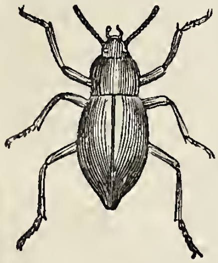
Of late years, B. have been much used for the dispersion of glandular tumours, and are also applied over the surfaces of indolent ulcers, with the view of increasing the vascularity of the part. For old diseases of joints, B. ought to be placed at a little distance from the affected joint.

**BLOCH, MARCUS ELIESER,** a celebrated ichthyologist, born of poor Jewish parents, at Anspach, in Bavaria, 1723. He was allowed to grow up in extreme ignorance. At 19, he had read nothing except a few useless rabbinical treatises. About that age, however, he became assistant to a Jewish surgeon at Hamburg, where he took the opportunity of learning German and Latin. A slight knowledge which he had acquired of anatomy inspired him with an extraordinary desire to study that science thoroughly. For this purpose he went to Berlin, and devoted himself to it and other branches of natural history with indefatigable zeal. He took the degree of Doctor of Medicine at Frankfort-on-the-Oder; and returned to Berlin to practise his profession, where he died 6th August 1799. His great work is the *Allgemeine Naturgeschichte der Fische* (12 vols., Berlin, 1782—1795, with 432 coloured plates), long the most comprehensive work on ichthyology, and still valuable especially for its pictures. His *Systema ichthyologiæ iconibus CX illustratum,* which was left in an unfinished state, was published by Schneider (Berlin, 1801). After his death, his collection of fishes was purchased by government, and forms a part of the Berlin zoological museum.

**BLOCK,** in the rigging of a ship, is an important part of the apparatus necessary for raising sails and yards, tightening ropes, &c. The B. comprises both the frame or shell, and the pulley or pulleys contained within it. In seamen's language, a *tackle* includes the rope as well as the B. through which it works. The uses of blocks are very numerous on shipboard; and to subserve these uses, they are distributed about the masts, yards, sails, and ropes. They vary greatly in size, shape, power, and designation; but nearly every B. comprises a *shell* or wooden exterior, a *sheave* or wheel on which the

From an early age, he dabbled in conspiracy, and submitted to its penalties with the pride of a martyr. After the revolution of February, he formed the Central Republican Society, which menaced the very existence of the Provisional Government. He it was also who organised the revolutionary *attentat* of the 15th May, the aim of which was to overthrow the Constituent Assembly. At the head of an excited mass, he made his appearance before the national representatives, and with that melodramatic love of liberty which makes a French patriot fancy it to be his first and most sacred function to emancipate the world, demanded the *resuscitation of the Polish nationality!* His coadjutor, M. Huber, went a step further, and pronounced the dissolution of the assembly. The latter fortunately proved itself strong enough to crush this insolence. B. was arrested, and condemned to ten years' imprisonment in Belleisle. In 1861 he was sentenced to other four years' imprisonment. He appeared again as one of the most active spirits in the Red Republican movement of 1870—1871, and once more became a prisoner of state. He died 1st Jan. 1881.

**BLAPS**, a genus of insects, of the order *Coleoptera*, the type of a tribe called *Blapsides*, the species of which are numerous, all of a dark colour, destitute of wings, and having the elytra or wing-cases united together. They run slowly, however, in comparison with many kinds of beetles, and inhabit dark and damp situations, feeding chiefly on dead vegetable matter. They have the power of secreting and emitting a brownish, acrid, irritating fluid, of a peculiar and penetrating odour, with which they appear to be furnished for the purpose of self-defence, and which some of them are capable of throwing to a distance of six or eight inches. *Blaps mortisaga* is a common British species, of about an inch long, and of a shining black colour. It is sometimes called DARKLING BEETLE, and CHURCHYARD BEETLE, sometimes seems to share with the Cockroach (q. v.) the appellation of BLACK BEETLE. It is a frequent companion of the cockroach in pantries and cellars.—*Blaps sulcata* is cooked with butter and eaten by Turkish women in Egypt, under the notion that it will make them fat, this being, in their estimation, one of the chief points of beauty.



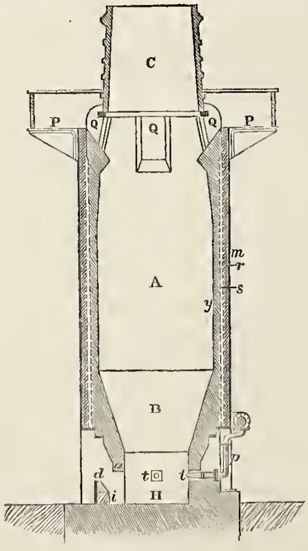
Blaps mortisaga.

**BLA'SIUS**, a saint and martyr, was Bishop of Sebaste, in Cappadocia, when Licinius began a bloody persecution of the Christians. B. left the town, and concealed himself in an unknown chasm in the rocks, but his abode was discovered by Agricola, while out hunting. The saint was conveyed to Sebaste, and as he steadfastly refused to deny Christ and worship the heathen gods, he was put to death (316 A.D.) with circumstances of the most horrid cruelty. At one period his worship must have been widely diffused, judging from the extent of territory over which his relics were scattered. The woolcombers claim him as their patron, for the singular reason that he was tortured, among other instruments, with a wool-comb. At Bradford, in Yorkshire, there is a septennial procession of that craft on his day. The practice of invoking St B. in cases of sore throats, is said to have originated in the circumstance that, when young, he saved the only son of a rich widow from being choked by a fish-bone. It has been conjectured, however, that the wool-comb has probably been mistaken for a fish-bone, and that the story of the rich widow's only son is simply a myth elaborated in explanation of the circumstance. St B.'s day is the 3d February.

**BLA'SPHEMY** is an offence against God and religion, by denying to the Almighty his being and providence; or by contumelious reproaches of our Lord and Saviour Jesus Christ; also all profane scoffing at the Holy Scriptures, or exposing them to ridicule and contempt. Seditious words, moreover, in derogation of the established religion may be proved under a charge of blasphemy. These all are offences punishable at common law by fine and imprisonment, or other infamous corporal punishment; for Christianity is held to be part of the laws of England; and a blasphemous libel may be prosecuted as an offence at common law, and punished with fine and imprisonment. In Gathercole's case, tried at York in 1838, where the defendant, a clergyman of the Church of England, was prosecuted for a libel on a Roman Catholic nunnery, and in which he also made a violent attack on the tenets and the morality of the Roman Catholic Church, it was laid down by the judge who tried the case (the late Baron Alderson), that a person may, without being liable to prosecution for it, attack Judaism, or Mohammedanism, or even any sect of the Christian religion, save the established religion of the country; and the only reason why the latter is in a different situation from the others is, because it is *the form established by law*, and is therefore a part of the constitution of the country. But any general attack on *Christianity* is also the subject of criminal prosecution, because Christianity is the public religion of the country. Thus, as an offence against religion, B. may assume one of two forms: first, either as against the articles and creeds of the Established Church; or secondly, as against a dissenting community, in the libel against whom, a general attack on the Christian religion is involved. The B. must in some manner have been overtly and publicly declared, either by a speech on some public occasion, or by the act of publication in print.

The Scotch law regarding this offence is now very much the same. The old severe Scotch acts, one passed in 1661, and another in 1695, which provided capital punishment for offences of this description, were repealed by the 53 Geo. III. c. 160. The punishment is now arbitrary at common law; and by the 6 Geo. IV. c. 47, the punishment of B. is further restricted, and made the same as in England. It is also enacted by the second section of that act, that a person convicted of a second offence may be adjudged, at the discretion of the court, either to suffer the punishment of fine or imprisonment, or both, or to be *banished* the country; but the provision as to the punishment of banishment is repealed by the 7 Will. IV. c. 5. The latest and most remarkable illustration of the Scotch law regarding this offence, is a case that was tried before the High Court of Justiciary in 1843. The prisoner, who defended himself, was accused, convicted, and sentenced to imprisonment for fifteen months, for publishing profane, impious, and blasphemous books, containing a denial of the truth and authority of the Holy Scriptures and of the Christian religion; and devised, contrived, and intended to ridicule and bring into contempt the same. In the course of the trial, the prisoner endeavoured to justify his conduct by quotations from the Bible, which, he maintained, warranted the language of the blasphemous works in question. But the court would not allow such a line of defence, and the Lord Justice-clerk (the late Right Honourable John Hope) in charging the jury, pointed out that the indictment charged, that the wicked and felonious publication of such works *is* a crime, and that therefore the jury were not to consider themselves engaged in any theological discussion, but simply in trying whether a known and recognised offence against the law had been committed. His lordship proceeded further to expound the law as follows: 'Now, the law of Scotland, apart from all questions of church establishment or church government, has declared that the Holy Scriptures are of supreme authority. It gives every man the right of regulating his faith or not by the standard of the Holy Scriptures, and gives full scope to private judgment, regarding the doctrines contained therein; but it expressly provides, that all "blasphemies shall be suppressed," and that they who publish opinions "contrary to the known principles of Christianity," may be lawfully called to account, and proceeded against by the civil magistrate. This law does not impose upon individuals any obligations as to their belief. It leaves free and independent the right of private belief, but it carefully protects that which was established as part of the law, from being brought into contempt.' The learned judge also observed: 'I think it also my duty to add—as a part of the [prisoner's] address was directed against the policy and expediency of this prosecution—that I think it was a most proper and fit prosecution. I have no doubt of the effect that will result from this prosecution; because, though, in his advertisement and address, this individual declares that he addresses himself chiefly to the working-classes of Scotland, yet I am sure that he deceives himself if he imagines that that is a class which would easily part with their belief in those truths, which are perhaps more valuable to them in this life than to any other class in the community. There may, indeed, be a class of persons, like the prisoner at the bar, in situations above that of the working-classes, young men whose education is imperfect, and their reading misdirected; and it is to save them from the mischief of these opinions that it is necessary the law should take its course.' See Religion, Offences Against.

**BLAST FU'RNACE.** Many costly experiments have been tried of late years in order to determine, along with other related questions, the best form of the blast furnace in which iron is smelted. Which is the most serviceable form is as yet a very much disputed point; but, according to the published accounts, furnaces of the unusual height of 80 to 100 feet give, as a rule, the best results. There are two types of blast furnaces, irrespective of differences in their forms, as regards the way in which they are constructed. Some are built with thick walls, either entirely of brick or of brick and stone, hooped with iron, forming massive towers. Others, again, are formed of comparatively thin brick walls, and depend for their strength on an outer malleable iron casing, in which case they are called *cupola* furnaces. The furnace A, in fig. 1, article Iron, is an example of the former, and the annexed figure represents one of the latter kind.



Blast Furnace.

The various parts of the furnace are distinguished as follow: A is the *shaft* or *body*, generally either in the form of a cone or cylinder, or somewhat barrel-shaped, in which case, the portion marked B is not distinguishable from the shaft. B is called the *boshes*, and is the part of the furnace which, from the high heat to which it is exposed, usually gives way first. H is the *hearth*, and C is the *tunnel-head*, which, however, is usually wanting when the mouth is closed by a bell and cone to save the gases generated in the furnace. P is the charging platform, and Q, Q, the openings through which the ore, fuel, &c., are fed. These materials are brought to the platform by hoists, inclines, or level gangways, according to the situation of the furnace. Just below the boshes there are four or five openings in the circumference for the *tuyeres t*, and another for the arrangements required for tapping the furnace. As respects the latter, *a* is called the tymp-arch, immediately below which is placed the *tymp* itself, consisting of a rectangular iron box containing water in a coiled pipe. The hearth is prolonged in the direction of the *dam-plate d*, and the space between it and the tymp is filled up with sand or clay, in which there is a channel for the escape of slag. In the damp-plate is placed the *tapping-hole*, *i*, through which the molten iron is run off. The pipe at *p* conveys the blast, produced by a powerful blowing-engine, and heated to between 600° and 1400° F. The B. F. may be used with the Siemens Gas Furnace. See Iron and Glass.

**BLASTING.** Before gunpowder was invented, the separation of masses of stone from their native rock could only be effected by means of the hammer and wedge, or by the still slower method of fire and water. In soft and stratified rock, wedges are still used for quarrying stones for building purposes; but in hard rock, or where regularity of fracture is no object, gunpowder is ordinarily employed. There are two kinds of B.—first, the small-shot system; and second, that of large blasts or 'mines.'

The small-shot system consists of boring holes into the rock, of from one to six inches in diameter, and of various depths, according to circumstances. In hard rock, this is done by a steel-pointed drill, struck by a hammer, and turned partly round after each blow, to make the hole cylindrical. The addition of a little water serves to preserve the temper of the boring tool, and makes the rock more easy to cut. In soft rock, whenever the hole is to be vertical, a 'jumper' is used; this is a weighted drill, which acts merely by its own weight, when let fall from about a foot in height. The powdered stone is removed at intervals by a 'scraper.' The rate of progress varies, of course, with the hardness of the rock. At Holyhead, the average work done by three men in hard quartz rock, with 1½ inch drills, is 14 inches in depth per hour; one man holding the drill, and two striking. After the hole is bored, it is cleaned out, and the powder poured down. A wad of dry turf or hay is put over the charge, and the rest of the hole 'tamped,' or filled with broken stone, clay, or sand. The shot is fired by a length of Bickford's patent fuse. When it is desirable to prevent the stones from flying about, when the shot is fired, a shield of boiler-plate, or of brushwood weighted, may be laid over the hole.

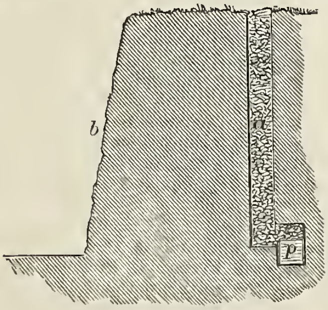
Small shots may be fired, even under water, by enclosing the charge in a tin case, with a tube of powder reaching to the surface; or in a canvas bag, well tarred, tied at the neck round a length of Bickford's fuse, which burns under water. The charge is inserted in the drill-hole; and the weight of the superincumbent water acts as tamping.

In removing the wall between the old and new Shadwell basins of the London Docks, shots were fired under water within a few yards of vessels lying in the basin, by using moderate charges, and by keeping a raft of timber floating over the hole, as a shield to prevent anything flying upwards.

The voltaic battery has been used for firing shots, chiefly under water, since 1839, in which year it was employed at the wreck of the Royal George and at the Skerryvore Light-house.

When a large mass of rock has to be removed at once, or where a steady supply has to be daily furnished of irregularly broken stone, for breakwater or other purposes, recourse must be had to large blasts, or 'mines.' The greatest isolated example of this kind of blasting was the overthrow, in 1843, of the Rounddown cliff at Dover, by 18,500 lbs. of powder, in three separate charges, fired simultaneously by voltaic electricity. But by far the grandest system of B. by mines is to be seen at the quarries for supplying stone to the breakwater at Holyhead, where small shots having been found inadequate, large mines were introduced in 1850. These large blasts are of two kinds—'shafts' sunk from the top of the rock; and 'headings,' or galleries driven in from the face.

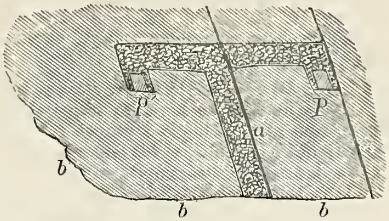
The shaft-holes are 6 feet long by 4 feet wide, of various depths, according to the height of the rock, but seldom much exceeding 60 feet. The deal-box, with the charge of powder, $p$, is placed in a chamber cut at one side of the shaft, so that the tamping may not be in the direct upward line of fire. The tamping consists of the stone and débris which have come out of the shaft; and the wires from the battery are protected from injury by being laid in a groove cut in a batten placed up one angle of the shaft.



Vertical Section of Shaft:
*a*, tamping; *b*, face of the rock; *p*, box for charge.

It is evident that the same point, $p$, in the rock may be reached as well by a heading or gallery driven in from the face of the rock, as by a shaft from the top, and often by a shorter route. Headings are made 5 feet high by 3 feet 6 inches wide, and are driven, if possible, along a natural joint in the rock. The direction of the gallery is changed and sunk at parts, to prevent the tamping from being blown out. Four men can, on the average, drive 5 feet run of heading per week; but cannot sink above 3 or 4 feet of shaft, which has a greater sectional area, and is more inconvenient to work in.

The charge of powder may be divided and placed in two or more separate chambers, as $p$ and $p'$; and it is better thus to spread a heavy charge over a length of face, than to have it in one spot, at a greater distance from the face than about 30 feet.



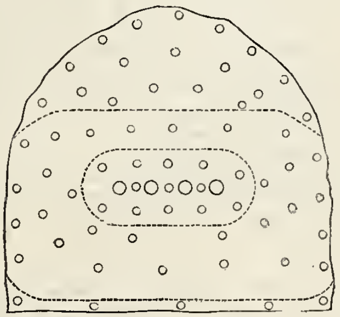
Sectional Plan of a Double Heading.

The charges for these mines vary from 600 lbs. to 13,000, and even more, pounds of powder; and the produce is from 2 to 6 tons of stone to the pound of powder, according to the density of the rock and the position of the mine.

Besides the quarrying of stone, B. is used for military objects, or where total destruction is aimed at, and an excess of powder is little or no objection.

Of late years great improvements have been effected in the production and application of explosive agents other than gunpowder, which latter, until lately, may be said to have been exclusively used for the purpose of blasting. Nitroglycerine (q. v.) and gun cotton (q. v.) were discovered within two years of each other; but while gun cotton was immediately applied to industrial purposes, nitroglycerine was destined to remain a chemical curiosity for about 16 years.

Dynamite is a preparation of nitroglycerine and porous earth, in the form of a pasty mass, which, without materially impairing its explosive properties, has the effect of rendering it perfectly safe to handle. For this and other explosives see NITROGLYCERINE in SUPP., Vol. X. For an important class of blasting and boring operations, see TUNNEL.



Section of Mont Cenis Tunnel.

**BLATTA.** See COCKROACH.

**BLAYE** (ancient *Blavia*), a fortified seaport of France, in the department of the Gironde, 20 miles north-north-west of Bordeaux. It is built on the right bank of the river Gironde, which at this point is about 2½ miles in breadth, at the base of a rocky eminence crowned with a strong citadel. The town is further defended by the two forts of Paté and Médoc, which command the passage of the river. The port of B. is a very busy one, all inward vessels being required to anchor and deliver the manifests of their cargoes; and many outward-bound vessels lay in their provisions here. B. has manufactures of linen and woollen, glass and earthenware; a considerable export-trade in corn, wine, brandy, oil, fruits, soap, &c., and tribunals of jurisdiction and of commerce. Pop., exclusive of garrison, 4000.

BLA'ZON, BLA'ZONRY (Ger. *Blasen*, to blow, as with a horn). These heraldic terms originated in the custom of blowing a trumpet to announce the arrival of a knight, or his entrance into the lists at a joust or tournament. The blast was answered by the heralds, who described aloud and explained the arms borne by the knight. B. and B. thus came to signify the art of describing, in technical terms, the objects (or charges, as they are called) borne in arms—their positions, gestures, tinctures, &c., and the manner of arranging them on the shield.

*Rules of Blazoning.*—As heraldry, though an entirely arbitrary, is a very accurate science, the rules of blazoning are observed on all occasions with the most rigid precision. The following are the most important: 1. In blazoning or describing a coat of arms, it is necessary to begin with the field, mentioning the lines by which it is divided—*per pale*, *per fess*, &c., if such there be—and noticing if they are *indented*, *engrailed*, or the like, it being taken for granted that they are straight, unless the contrary be mentioned. 2. There must be no unnecessary repetition in blazoning; thus, where the field is blue, and the charges yellow, we should say, *azure, a crescent between three stars, or*, thereby implying that both the crescent and the stars are *or*. 3. For the same reason, where a colour has been already mentioned, and it is necessary, in order to avoid ambiguity, to repeat it in describing a subsequent charge, we say, *of the first*, or *of the second*, as the case may be. Thus, we should say, *azure, on a saltire argent, three water bougets of the first*, thus avoiding the repetition of the word azure. 4. Again, recurring to our first example, it would be an error to say, *three stars with a crescent between them*, because we must always begin with the charge which lies nearest the centre of the shield. 5. Where the charges are of the natural colour of the objects or animals represented, in place of describing the colour, you simply say *proper*—i. e., of the proper or natural colour. 6. Another general rule in blazoning, or rather in marshalling coat-armour, is, that *metal shall never be placed upon metal, nor colour upon colour.*

The rules for blazoning separate charges, whether animate or inanimate, are indicated in the descriptions which will be found of them under their respective heads. See ORDINARIES; also BAR, BEND, &c.

BLEACHING (Ang.-Sax. *blæcan*, from *blæc*, pale, bleak) is generally understood to mean the process of whitening or decolorising cloth; but the term is also applied to the decolorising of such substances as the fixed oils, Irish moss, &c. Until about the close of the 18th c., B. depended upon the natural bleaching agencies present in the atmosphere and in the sun's rays. The usual plan was to spread out the cloth on a grass field, called a bleaching-green, and to continue sprinkling it with water several times a day. After being thus exposed for several months to the action of air, light, and moisture, the cloth was rendered white. The process was necessarily tedious and occupied much valuable land, and for this reason a large quantity of the cloth required to be bleached was sent to Holland for that purpose. A particular kind of linen, which was regularly sent to Holland, received on that account the name of *Hollands;* and another variety of linen, which, from its fineness, was generally spread on the better grass-fields or lawns, received the title of *lawn*. An improvement in the preceding process was to dip the cloth occasionally in a weak *alkaline lye*, or solution of an alkali, such as soda in water, which step was called *bucking;* after which, the cloth was spread out on the grass for some weeks, and regularly moistened with water, this stage being styled *crofting;* the cloth was then soaked in sour milk and water, which was called *souring*, and again exposed on grass to the action of air and sun-light. By repeating the bucking, crofting, and souring operations several times, the bleaching was very much hastened, and the amount of land occupied in bleaching-greens lessened. The next improvement was the introduction of dilute sulphuric acid instead of sour milk, as the souring agent; and this was so effectual, that it lessened the time required for B. from about eight months, which was the original time, to about four months.

Till very recently, it was thought that the agent in this natural mode of B. was entirely resident in the sun's rays, but the discovery of the substance called Ozone (q. v.), which possesses very powerful B. properties, and which in greater or less quantity exists in the air of country districts at all times, has led to the opinion, now held by chemists, that the B. which takes place when cloth is moistened and exposed to the air is mainly due to the ozone present therein; though the chemical rays which accompany the luminous rays of the sun may assist in the B., and also aid in the formation of the ozone. That the ozone has very much to do in open-air B., is observable from the fact that in town districts, where little or no ozone exists in the air, cloth is never bleached white.

In the year 1785, Berthollet, a distinguished French chemist, discovered the powerful B. properties of *Chlorine* (q. v.), and immediately thereafter it was suggested that chlorine would be useful in the B. of cloth. At the first, the gas chlorine was employed, and being diffused in the atmosphere of a vessel or small apartment, cloth hung therein was speedily bleached. It was found, however, that the chlorine, which bleaches, or destroys colour by uniting with the hydrogen of the colouring principle and thus decomposing the colour, could also unite with the hydrogen of the fibre (see LIGNIN) and destroy or render tender the textile fabric. So long as chlorine was employed in the gaseous state, it was very difficult to use it of such strength as only to destroy the colour, without also rotting the cloth. It was then suggested, that as chlorine was soluble in water, to the extent of two volumes of chlorine gas in one volume of cold water, the solution of chlorine might be employed. But although chlorine water was found to act efficiently and safely when the solution was of the proper strength, it was very difficult always to make it of the same strength, and more so to preserve it when made; as the least exposure to light causes more or less of the chlorine to unite with the hydrogen of the water, forming hydrochloric acid, which does not possess B. properties. After attempts to fix the chlorine in alkaline solutions, it was found that dry slaked lime was an admirable absorber of chlorine gas. The material produced from the union of chlorine with dry slaked lime is known as the *chloride of lime*, or *Bleaching powder* (q. v.), and this is the substance which has continued from 1799 up to the present time to be the great artificial bleacher of cotton and linen fabrics. It is not serviceable in the destruction of the colour of wool, silk, or the oils and fats; such materials being bleached by the employment of other agents, as will be afterwards noticed.

Bleaching of Cotton and Linen Fabrics.—The substances requiring to be got rid of in the purification of cotton and linen cloth, are (1) the organic colouring matter naturally present in the fibre; (2) resinous and fatty bodies, also inherent in the fibre; (3) weavers' dressing and perspiration taken up during the process of spinning; and (4) certain saline or earthy substances. The *first stage* in the B. is the singeing of the cloth, which is accomplished by drawing the cloth rapidly over a red-hot iron cylinder, or a numerous series of gas jets, which burn off the minute particles of fibre, resembling in appearance short hairs or down, and leave the cloth perfectly smooth. The *second stage* is the washing or scouring of the cloth, which consists in rolling up the pieces of calico or linen into bundles like coils of rope, and throwing a number of pieces into a large vat among lukewarm water, and allowing them to lie till fermentation begins, and proceeds some length, when the cloth is taken out, and thoroughly washed in the dash-wheels; which are large horizontal cylinders divided into several compartments, into each of which a stream of water keeps running while the wheel is turning. The *third stage* is boiling with lime-water, or *bucking*. The apparatus employed is called the *Bouking* or *Bucking Kier*, and consists of two compartments. The lower part is a boiler containing the lime-water, and the upper part is a capacious circular tank, into which the cloth in bundles, as it comes from the dash-wheels, is placed. By an ingenious arrangement, the lime-water is alternately forced up, by the compression of the steam, through a pipe into the upper compartment, and falls in a shower upon the cloth, through which it percolates and sinks again through perforations into the boiler, to be again propelled into the upper compartment. Instead of using lime alone, a mixture of lime and carbonate of soda ($NaOCO_2$) is occasionally employed, which acts by forming the inert carbonate of lime or chalk ($CaOCO_2$) and caustic soda ($NaO$), which possesses high detergent properties. The chemical action which the boiling lye exerts on the cloth is in the formation of a soap with the resinous and fatty substances naturally inherent in the cotton or linen fibre, or communicated to it in the process of weaving, the greater portion of which is detached by the lye in the *bucking kier* and ultimately removed by a subsequent washing with water. This takes place either in the dash-wheels, or in a more effectual washing arrangement, consisting of a series of boxes or vats of different depths, placed side by side, into which the cloth is made to dip successively by passing over and under two sets of rollers. As the cloth moves on from the lower vats to the higher, it is passing from the soiled water to the more pure, as a stream of pure water is kept constantly running through the vats from the higher to the lower. The *fourth stage* in B. is the *souring* or *chemicking* in dilute sulphuric acid, of the strength of one gallon of the acid to from 25 to 30 gallons of water. The weak acid liquid is put into a large stone vat, and the goods are steeped in it. The acid acts beneficially in removing the remaining traces of the lime-soap which have adhered to the cloth, and a second washing in water, followed by bucking or scouring in soda lye, and a third washing in water are generally found necessary to obtain the cloth in the condition best suited for the subsequent operations. The *fifth stage* is *chemicking with B. liquor*, obtained by dissolving *B. powder* (q. v.) in water, and allowing the impurities or insoluble matter to subside. The B. liquor is much diluted with water, and the cloth is steeped in it for about six hours, then taken out, and allowed to soak for other six hours in a second vat containing water, after which it is drawn out and exposed to the atmosphere, when the carbonic acid of the air sets free a portion of the chlorine from the B. powder, imbibed by the cloth. The *sixth stage* is another *souring* process, during which the cloth is immersed for about four hours in a steeping vat, containing dilute sulphuric acid of the strength ranging from 1 to 8 gallons of acid in 200 gallons of water. This acid liquid, as it soaks the cloth, encounters the B. liquid which previously saturated the fibre of the cloth, and the acid combining with the lime of the B. liquid, liberates the chlorine, which attacks the remaining traces of colour and removes them from the cloth.

The cloth, on being removed from the souring-vat, is boiled with soda lye, washed, and again treated with dilute sulphuric acid, which more effectually removes the decomposed colouring matter. It is thereafter thoroughly washed, passed through rollers to remove some of the water; then introduced into the *Hydro-extractor*, to get rid of the water more effectually; and lastly, the cloth is dried by being suspended in the air, or by being passed over a series of heated tin rollers, called *Steam Cans.* In the ordinary course of B., cotton loses about one-twentieth of its weight, and linen about one-third.

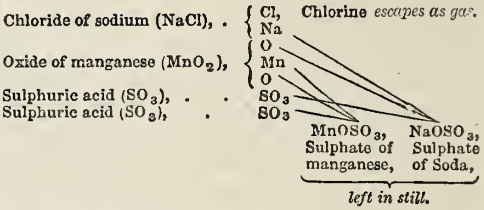
After the B. operations have been successfully performed, it is customary to proceed to the *finishing* of the cloth, which consists in, firstly, passing it through a large mangle, where the crumpled piece of cloth becomes smooth; secondly, drawing the cloth over rollers, which cause it to dip in a trough containing starch; thirdly, drying the starched cloth; and, fourthly, passing it through a large mangle or calender, consisting of a series of rollers, alternately of polished cast iron and solid paper, and which not only smooth out the cloth, but communicate a fine glazed surface, such as is generally exhibited in bleached cloth when purchased. The cloth intended to be printed upon or to be dyed is not starched or calendered.—The operations connected with the B. of cloth by chlorine exert no injurious effect on the health of men and women engaged in them. Some of the bleach-works near Glasgow are of long standing, and give regular employment to several hundred women. The rapidity with which the B. by chlorine can be carried on, may be understood from the fact, that when pressed for time, it is no uncommon thing to bleach, finish, and return to town 1000 pieces of cloth within 48 hours. Valuable in many respects, however, as is the rapidity of B. by means of chemical agents, it must be admitted that the process exerts a certain weakening effect on the cloth, and that, after all, B. according to the old method on the grass is preferable. Grass-B. is therefore still in use where time admits, as also for clearing linen and cotton apparel in domestic washing. See Washing.

Bleaching of Wool is never accomplished by B. powder, but recourse is had to sulphurous acid, which disguises the colour of the wool by combining with it to form a colourless compound. Originally the wool is contaminated with a greasy substance called the *yolk*, which naturally exudes from the skin of the sheep, and this unctuous matter mainly consists of a kind of soap soluble in water. The *first stage* in the B. of W. is to get rid of the yolk, which can be done by long-continued washing in water; but as this is tedious, the general plan is to steep the wool in a vat containing one part of stale urine and five parts of water, then boil for some time, and ultimately strain the wool and wash well. The agent in the stale urine which acts upon the yolk is carbonate of ammonia, and this acting upon the oily matters forms a soap which can be readily washed away. When woollen cloth is to be bleached, it is customary to substitute carbonate of soda (washing soda) for the stale urine, and this forms an alkaline lye, which performs the same part as the carbonate of ammonia. Soap is sometimes used as an auxiliary. The *second stage* of bleaching wool is the *sulphuring*, which takes place in a small wooden apartment, in which the damp cloth is suspended in regular folds from the roof to the floor, and a small pan of ignited sulphur being introduced, the doors, &c., are firmly closed. There are little openings round the sides of the chamber, for the admission of air, which can be closed at pleasure. The sulphur (S) in burning takes up two atoms of oxygen from the air, forming sulphurous acid ($SO_2$), which is the bleaching agent; and in about 24 hours the operation is finished, and the woollen material only requires to be thoroughly washed with water, which may contain a little potash or soda. Where the wool is naturally high-coloured, it is necessary to repeat the various stages of the process several times before the bleaching is complete. Instead of applying sulphurous acid in the gaseous form, a solution of it in water is sometimes used. An economical method of preparing the solution of sulphurous acid is to introduce a mixture of sulphate of iron and sublimed sulphur into an earthenware retort, and apply a low red heat, when sulphurous acid is disengaged, which is passed through a vessel containing some porous matter, such as moss, to retain mechanical impurities, and then transmitted through a series of bottles containing water, where it is dissolved to the extent of forty volumes of the gas for every one volume of the water. The bleaching of wool by sulphurous acid is not so complete as the bleaching of cotton or linen by chlorine. In the latter case, the colour is destroyed, but in the former, the sulphurous acid merely combines with the colouring matter to produce a colourless compound, from which the colour can again be revived, either by soaking the wool in a dilute acid, such as sulphuric acid, or a dilute alkali, such as soda. Hence it is that new woollen cloth or garments, such as flannel, blankets, and underclothing, though almost colourless when purchased, yet after being washed several times, return to their natural yellow; for the soda used, as well as the soap which contains potash or soda, destroys the colourless compound formed in the texture of the wool during the sulphuring, and resuscitates the original colour.

Bleaching of Silk is carried on in a manner very similar to that pursued in the bleaching of wool. The silk has naturally a good deal of wax, accompanied by oil and colouring matter, enveloping the fibre, and the silk stuffs are repeatedly boiled in water containing a little soap or carbonate of soda, the alkaline nature of the solution being occasionally tempered by the admixture of some bran, which contains an acid. When well scoured and washed, the silk is obtained white enough for many kinds of printing; but where it is desirable that a pure white be obtained, the silken stuffs are introduced into a very weak solution of sulphurous acid, and thereafter thoroughly washed.

Other substances employed in the arts and manufactures are subjected to a process of bleaching; as the rags which are being manufactured into Paper (q. v.), the palm-oil which is being converted into Candles (q. v.) and night-lights, and the Straw (q. v.) of which hats or bonnets are made; but the details of the processes followed in these and other operations, will be described more properly under their respective headings.

**BLEACHING POWDER**, a combination of chlorine and dry slaked lime (see Bleaching), was first manufactured on a large scale in Glasgow by Mr Charles Tennant, who obtained a patent for its preparation in 1799. The substances employed in preparing the chlorine are common salt (chloride of sodium), black oxide of manganese, and sulphuric acid. The operation may be conducted in one or in two stages. The vessel used is a still. The whole apparatus is made of strong sheet lead, or of cast iron, or of grooved stones fitting closely. The more general plan is to have the upper part of lead, and the under part of cast iron. The lower third of the still has usually a double jacket, or double walls, between which steam is admitted through a pipe for heating the contents of the still. In using the apparatus, 100 parts of black oxide of manganese ($MnO_2$) and 150 parts of common salt (NaCl) are introduced by an opening in the top, which is closed by a water-joint; 185 parts of sulphuric acid ($SO_3$), of specific gravity 1600, are then poured in by a funnel, and on the admission of steam into the jacket, chlorine is evolved, and issues by a tube at the head of the still. The theory of the changes that occur in the still is represented in the following table, there being two equivalents or atomic weights of sulphuric acid for one equivalent of each of the other ingredients:


Chloride of sodium (NaCl), .
Cl,
Na
Chlorine *escapes as gas.*
Oxide of manganese ($MnO_2$),
O
Mn
O
Sulphuric acid ($SO_3$), . .
$SO_3$
Sulphuric acid ($SO_3$), .
$SO_3$
$MnOSO_3$, Sulphate of manganese,
$NaOSO_3$, Sulphate of Soda,
*left in still.*

The pipe which carries away the chlorine gas is connected with a stone or leaden chamber, into which it enters at one or more points, and the chlorine entering, comes in contact with dry slaked lime in fine powder, with which the floor of the chamber is covered to the depth of some inches. The chlorine is rapidly absorbed by the lime, which, when the absorption flags, is stirred from time to time by wooden rakes. The process must not be allowed to proceed too quickly, as much heat is evolved during the combination of the chlorine with the lime; and if the temperature of the chamber rises beyond 110° F., the power of combination is very much lessened.

The material which is left in the still as a residuum, consisting of the sulphate of manganese and the sulphate of soda mixed together, is comparatively worthless, and accordingly it is found more economical in large chemical works to divide the process of the manufacture of B. P. into two stages, at each of which the residuum is of commercial use, and can be worked up into marketable products. The first stage is to heat the common salt and sulphuric acid together, when hydrochloric acid (q. v.) is disengaged in the gaseous state, and is received in proper vessels, and the sulphate of soda—from which common soda (q. v.) is prepared—is left in the retort or still. The hydrochloric acid thus obtained, is then placed along with the black oxide of manganese in the still, and on the steam-heat being applied, chlorine is evolved and is conducted to the lime chamber, while chloride of